

April 6, 1929

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20 Cents (40c. 1930)

AVIATION

The Oldest American Aeronautical Magazine



You can hit the top with men like that!

The Berliner-Joyce ships, and the entire engineering staff are seasoned by years of outstanding accomplishment.

FIRST look at the engineering staff:
As Chief Engineer, Frank S. Holbrook (Miss Just Tech) brings a wealth of experience, coming directly from the responsibility of executive head of the Technical Department of Curtiss.

And standing beside him as Chief of Research is William H. Miller (Miss Mission and M.E.T.) an outstanding aerodynamic expert, designer of the wind tunnels at Massachusetts Institute, lately in charge of Research Laboratory at Curtiss.

DESIGN AND CONSTRUCTION

William West, Jr. is best known as the design engineer on the most successful Curtiss models, including the Schneider Cup and Pulitzer Trophy races. Then he went to Chance-Vought and now is Berliner-Joyce Chief of Design.

Earl P. Osborn (Remorque Polytechnic) is in charge of Structures. He was in charge of the propeller department at Curtiss, later made head of Curtiss Structural section.

As factory superintendent, Thos. E. Pell (Lehigh Univ.) brings a wealth of experience from the same responsibility with the Naval Aircraft Factory at Philadelphia.

BACK OF IT—

Henry Berliner (Miss Just Tech) was the designer and builder of the Berliner helicopter and monoplane, and president of the absorbed Berliner Aircraft Company. He became Vice-President of Berliner-Joyce in charge of Production.

Temple N. Joyce (Rens Poly and Lehigh Univ.) is internationally known as test pilot for the Army during the war, testing practically every type of plane constructed by the Allied and Central Powers. Late Washington representative of the Curtiss Company, and then sales manager for Chance-Vought. He is Vice-President in charge of Sales.

Gathering this truly unusual technical and manufacturing staff together, stands W. W. Moss, formerly Vice-President and Controller of Curtiss, who is President of the new Corporation.

THE FUTURE

What do you expect of such an experienced and balanced staff as this? The B-J ships now in design promise to set new standards in aviation.

BERLINER-JOYCE
AIRCRAFT CORPORATION

Office
HEARTY TOWER BUILDING
BALTIMORE



Factory
ALEXANDRIA, VIRGINIA

New Quarter-Million dollar plant now building at Baltimore

The Result of Unified Design— The ARGO

Yes, that, engineers, an Argo in the air seems far more than a thing of metal, wood and fabric. Rather does she become a part of her pilot.

Does he call her speed? It's his in command—125 miles per hour. Check? Lots of engine. A real motorist on a powerful team? Be sure to her controls as though she would her pilot's every thought.

By an Argo, for fun or profit. Start with the plane for a part of you.



Perhaps your work is the secret of most success. And men work together the Argo.

A ship, built for her engine. An engine built for the ship. The Argo Airplane and the Hans Warner Aircraft Engine are the product of one organization. Designed for each other in such an intimate way, it is small wonder that the performance of this perfect team is outstanding. Here is present day performance on a commercial plane at a price that is changing many ideas of the plane value.



The
HANS-WARNER
Aircraft Engine

The ALLIANCE AIRCRAFT CORPORATION, alliance.0.

Peru relies on Mobiloil in conquest of the Andes



Keynote airplanes, powered such Wingo-Wingbuds are used along the Guayaquil River to the Lima to Iquitos route. The primary planes used of these powerful planes being supplied with Geopole Mobiloil.



VAST regions in South America, fabulously rich in natural resources but hitherto practically inaccessible, are now being exploited through the rapid development of commercial aviation.

The Peruvian Government was among the first to take advantage of the immense opportunity offered by this new means of transportation. Regular air lines now connect Lima, on the sea coast, with distant inland points lying beyond the towering Andes and across hundreds of miles of trackless forests.

The traveler going from Lima to Iquitos, near the headwaters of the Amazon, covers

comfortably in less than 24 hours a distance which formerly required weeks of tedious travel by rail, automobile, mule-back and river boat.

Other great air lines all over the world rely on Mobiloil for dependable lubrication of airplane engines, just as famous pilots and most aircraft manufacturers have done since the very beginning of aviation history.

You will find Mobiloil on sale at or conveniently near every airport in the world.

VACUUM OIL COMPANY

Makers of high-quality lubricants
for all types of machinery

the New



Mobiloil

THANK YOU for watching AVIATION

AIRCRAFT DEALERSHIPS

Aircraft dealerships offer the same sources of definite and generous profits as did the early automobile franchises. Provided, of course, that the proper dealership be selected. The Flamingo is sold under two merchandising plans. One for established dealers, similar to the automobile franchise plans. The other an arrangement suitable for dealers, or by those not now engaged in aircraft marketing, which involves no preliminary commitment.

The following facts concern the advantages of Flamingo dealerships.

1. Public opinion grows and will shortly demand all metal aircraft because of the practical absence of fire hazard and the greater safety factor.
2. Transport operators prefer all-metal aircraft because of its reliable maintenance and depreciation costs.
3. The simplified fabrication and production methods employed in the manufacture of the Flamingo permit its sale in the same price and performance range as the old types of construction.
4. The demand for transport planes exceeds the present supply. This is not true of the lighter type of sport and training ships. The market for transport planes is of much wider and more diversified scope, offering easier and more attractive profit margins to dealers.
5. In the field of transport planes the Flamingo stands pre-eminent in visibility because of its adaptability to practically any class of service, its low maintenance and

depreciation, its attractive economy of operation—in short, its unquestioned utility.

6. The Flamingo market will be always stable. Alert departments of engineering and economical research guarantee that Flamingo design and merchandising methods will always be in advance of competition.

7. The experience and resources of twenty-six nationally known financiers ensure the continued solid foundation of the Metal Aircraft Corporation of Cincinnati.

8. The Flamingo is an all-metal, high-wing, cabin monoplane comfortably accommodating six passengers and pilot—powered with either the Pratt and Whitney "Hornet" or "Wasp" engines—cruising at 115-120 mph—top speed 132-135 mph.

9. A request on your letter-head or a personal visit to our booth at the All-American Aircraft Show, Division, April 6-11, will bring complete information on our plans of merchandising and dealership.

ALL METAL Flamingo

METAL AIRCRAFT CORPORATION
OF CINCINNATI, OHIO
LUNKEN AIRPORT

THANK YOU for watching AVIATION



An Air Metropolis is Determined by Basic Economic Factors

In the last analysis aviation is exactly the ultra-modern in fast transportation. Its greatest service is performed in linking communities and cities that are far apart. The air transportation center will be that city which is the hub of vast areas.

The aircraft industry serves transportation and tends to locate its activities at such a center especially when the production, sales and distribution costs of aircraft and engines are less. It is the aviation market place of the nation—the magnet of aviation growth.

"Nearest by Air To Everywhere"

Customers will be sure only when this center is truly built on the basis of existing facilities or plans. It is essential that every leader in aviation be near where the bulk of you.

Chamber of Commerce of

KANSAS CITY

Industrial Committee, Room 45
Chamber of Commerce, Kansas City, Mo.

Please send me without obligation "The Book of Kansas City Facts." I am especially interested in information on the following subjects:

☐ Railroad Production Costs ☐ Air Transportation ☐ Flying Schools ☐ Aircraft Market

Name Business Title

Address Nature of Business

City State

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Outstanding factors in Development of Kansas City

1. Center of Transportation.
2. Close-in Airport—1½ miles from business section.
3. Economy of Production.
4. Center of Market.
5. Ideal Weather Conditions.

Kansas City, Mo.

In HANGAR building
...a new field with new
untried problems
nothing can guide you
but EXPERIENCE

*At it since
War Time!*

The H. H. Robertson Company has been building hangars since the days when the United States was building war hangars in France. This photograph shows a typical U. S. Government hangar with roofs and chimneys of R. F. M. (Robertson Precision Steel).



ROBERTSON

Has the Experience

Hundreds of strange and bewildering new questions confront you when you build a hangar.

—Shall you cover it with unprotected metal roofing and siding and take a chance on rust destroying it?

—Or shall you go to the other extreme and tie up thousands upon thousands of dollars in a hangar of heavy construction?

—Or what about this RPM material that is a happy medium between the two extremes?

—And shall you put on ventilators, or take a chance on the motor exhaust fumes getting out by themselves without having any?

And so on and on—many questions and problems that never came up in other fields of construction. Lots of people can guess at the answers... but the only real answers come from experience.

The H. H. Robertson Company CAN answer those hundreds of questions for you from experience. Its record in hangar-building is one of the longest and most complete in the history of this new industry. That experience has been gained in all four corners of the world.

Take advantage of that experience. Bring your problems to Robertson engineers. Their suggestions will cost you nothing and will not obligate you. Write or send your blueprint.

H. H. ROBERTSON CO. - PITTSBURGH, PA.

ROBERTSON



THANK YOU for supplying AVIATION



A New-Day Conception of *Safety and Performance*—by Nicholas Beazley!

Picture a low-winged monoplane, streamlined for grace and speed—eager to charge straight up a sunbeam!

Step into this plane and take off—with a very short run. In a few seconds you are in the air, —in one minute you are 1200 feet skyward, in eight minutes 8000 feet. Then forward, you sweep the sky at 105 miles an hour.

You are in the Barling NB3!

All metal structure gives unbelievable strength to this new, low-winged monoplane yet it is lighter by many pounds than other planes of equal ability. First as an arrow, it consumes no more fuel than a small motor car! Power it has

in abundance—from a small 60 horse-power LeBlond Engine. Performance with this small power plant far exceeds that of the average ship of this capacity with twice the horse-power. Steadiness? When you fly the Barling NB3 you will believe Elliott White Spring's remark that "Anyone not blind or maimed both arms can fly". Unlike the average small ship, it does not require an experienced pilot—because of its patented wing construction and the advanced method of applying the dihedral angle. Hands-off flying with perfect ease—even in rough air—is no feat at all in the NB3. And you land like a feather floating to rest.

Safety has been assured by eliminating wires, snaphooks and other lesser parts. The U-spar wing has no point of vulnerability. This construction, coupled with exceptional maneuverability, makes the NB3 unusually reliable.

Most surprising of all is the price. The only all metal structured, three-place monoplane in the United States for less than \$10,000, the Barling NB3 is yours for only \$3,600, flyaway.

PERFORMANCE DATA:—With useful load—613 pounds.... Top speed—107 miles per hour at sea level.... Cruising speed—87 miles per hour.... Service ceiling—10,000 feet.... Absolute ceiling—15,000 feet.... Cruising—3 hours or 315 miles.... Climb to 12,500 feet—45 minutes.

SPECIFICATIONS:—Span—32 ft. 6 in.... Chord—5 ft. 2 in.... Area, Wing—1294 sq. ft.... Area, Tail surface—23 sq. ft.... Dihedral—5 degrees.... Length—21 ft. 6 in.... Height—6 ft. 10 in.... Weight—690

lbs. (empty).... Total weight—1303 lbs. (loaded).... Useful load—613 lbs.... Wing loading—8.5 lbs. per sq. ft. fully loaded with pilot, two passengers and full of gas and oil.

EQUIPMENT:—Dual Control.... Adjustable Pilot Seat.... 26x38 Tires.... Wings wired for navigation lights.... First Aid Kit.... Fire Extinguisher.... Dash Carbonator Choke Control.... Dash Carburetor Airslide Adjustment.... Altimeter.... Torquemeter.... Oil Pressure Gauge.... Oil Temperature Gauge.... Air Speed Indicator.... Dual Ignition Switch, front and rear.... Gasoline Gauge.... Fuel-flow indicator wings.... LeBlond 60 h. p. Engine.... Engine tools.... Wood Propeller.... Cockpit Covers.

There are still several territories available to financially responsible distributors who can qualify to handle this New-Day Plane. All inquiries should be addressed to our Manufacturing Division.

NICHOLAS-BEAZLEY AIRPLANE CO., Inc.
Manufacturing Division
MARSHALL, MISSOURI

BARLING NB3 Monoplane



PERFORMANCE

MONOPLANES CESSNA

Two planes take off... their wings tilt... the same way... the same destination.
They're on their course—modern turning over the same R. 7 1/2.

But let's! One is getting steadily ahead of the other... it's not going.
It's riding the rough air currents faster, less... more to be just doing things.
Then it falls away into the distant sky—and then, leaves later the rest of the race.

"The CESSNA loaded first... in the lead."
That's the story of CESSNA PERFORMANCE—repeated almost daily wherever Cessna fly—
—it's the story of Earl Hamilton and his victory from New York to the Coast, the story of Stinson in Alaska, and many others,
—and through it is woven the story of Clyde V. Cessna himself—Founder, Plane Builder. It's a long open book that reads airplanes which he has built 18 years ago—his which did fly the first CESSNA of today—his 18th plane—
But Cessna Performance today is proof that there is no substitute for experience, and these years of experience have made the CESSNA—Model 30

THE MASTER OF THEM ALL

CESSNA
A MASTER EXPERIENCE

All new Cessna Models will be shown at the Detroit All-American Aircraft Show. We'll welcome you at our booth—and gladly tell you the full story of Cessna Performance—why the Cessna, Horse Power for Horse Power—is from 10 to 20 miles per hour faster.

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WICHITA
U.S.A.

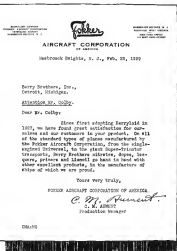
PLEASE DO NOT FORGOT AVIATION



THE BERRYLOID FLEET NO. TWO

Fokker Red, French Gray, Black and White
Mott, Berryloid colors is a combination suggested by the Cessna, beauty and product this Fokker Super-Tri-Motor

FOKKER SUPER TRI-MOTOR
and
Berryloid
AIRCRAFT FINISHES

BERRY
FINISHES
Standard
on all
FOKKERSFOKKERS WAS CHOSEN
IN THIS CASE BY EVID-
ENCE AND OTHER FACTS
OF SUPERIOR

Berry Brothers holds the patronage of manufacturers who adopt Berryfield. Most builders have installed their finishing departments with the cooperation of experts in Berry's Aviation Division and have standardized on Progressive Aircraft Finishes.

PROGRESSIVE · AIRCRAFT · FINISHES

BERRY BROTHERS
Varnishes Enamels Lacquers
Detroit Michigan Buffalo New York



Number Two of a Series
of Fact-Statements Regarding
a New Industrial
Leader—Great Lakes
Aircraft Corporation.

Management

AN INSTITUTION is the longbeared shadow of the men responsible for its policies and product. Sound management is the most important single factor in the successful conduct of any business.

Recent announcements regarding important additions to the executive personnel of Great Lakes Aircraft Corporation have more than ever convinced the aviation world of the serious purpose underlying its development. The ability to attract executives of this type is in itself a

significant measure of any industrial organization. The broader scope now offered to their respective talents has raised unusual expectations with regard to new vision in design, new quality and performance of product.

The respect which past accomplishment has already won for those comprising the active management of this Corporation will be measurably increased by the results of their current activities in the interest of safe, fast air transportation.

GREAT LAKES
CORPORATION



AIRCRAFT
CLEVELAND

Military and Commercial Airplanes · · · · · Seaplanes and Floats · · · · · Aluminum Alloy Parts

Cylinder Head

made of
BOHNALITE



A Master Part by Master Craftsmen

Here is a new cylinder head made of Bohnalite which the aviation community recently produced. It is a particularly fine casting, yet it is but one example of scores of safety aircraft parts made by Bohnalite master craftsmen.

Bohnalite patterns are made for exactness and precision. For years Bohnalite pattern makers have been drilled to accurate dimensional accuracy and the thoroughness of this training is reflected in Bohnalite quality castings. Bohnalite castings are better because they are safer.

Bohnalite Division

JOHN ALUMINUM & BRASS CORPORATION, DETROIT, MICH.
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The Handy Book, with its complete data and blue prints, is precious to over 15,000 designers, draftsmen, engineers, tool makers and production managers responsible for designing, tooling up or producing of stampings and pressed metal parts. Just \$5.00 to coupon and mail. This valuable book will arrive by return mail without cost or obligation.

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Don't miss it!

Don't miss Spalding's booth at the International Aircraft Show in the Exposition Hall at Detroit, April 6 to 13.

Here you'll see the greatest variety of aviation equipment ever exhibited in an aircraft show. Seats, boots, goggles, gloves, helmets, jackets, etc., etc., and so on.

Remember—there've been so many developments in equipment as there've been in engines or planes.

Remember—you'll see these up-to-the-minute developments at Spalding's booth.

Don't miss it!

A. F. Spalding & Sons
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AVIATION EQUIPMENT

THANK YOU for reading AVIATION



I have no fear

WHEN the water widens to the dock, and boathouse little tags pull my floating world away, I know that no white of the salty deep sea gods can confuse my passage, for I recall a thousand other safe crossings by this gigantic liner and her stately sisters. ¶ When I toss my bag to a grinning porter, and great wheels flash their sparks from ringing rails, the unheard rumble of a thousand other trains assures the safe arrival of this—these brother. ¶ When my fingers tighten on the wheel and the speedometer rushes up to 70, I hear no flurry of rivet parts, for the wind whistles back the message that a million others have done—and do—the same. ¶ And when I venture into the air, or watch those I love and cherish slip up toward the stars, the knowledge that the engine bears the name of Continental and is bred of a line that has been synonymous with dependability for upwards of a quarter century, that knowledge, I say, stills the rush of the winds and drowns into insignificance the vast, vacant spaces below—and I have no fear.

Continental Motors Corporation, Aeronautical Division, Office and Factory: Detroit, Mich., U. S. A.

Continental Motors

THE LARGEST EXCLUSIVE MOTOR MANUFACTURER IN THE WORLD

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SAFE STRONG SWIFT



To fly a Lockheed
Vega is more than to fly
the world's fastest commercial plane! It is to fly with a new
feeling of confidence looking full pos-

sition in a consciousness of design that places be-
hind that speed tremendous safety factors achieved
through rugged construction. Safety, Strength, Speed

...all these, in Lockheed, unite to establish a cri-
terion for RELIABLE SERVICE that Lockheed alone can
equal. Lockheed Aircraft Company,
Los Angeles, California

Waco Air Express, Type Certificate No. 107
Whitetail Vega, Type Certificate No. 49
Wing Vega, Type Certificate No. 52

A new Lockheed, THE
EXECUTIVE, will be
exhibited for the first
time at the Detroit
Show. Inspiration by
business executives is
invited. Complimentary
aeronautic service
will be afforded to the
relative to those wish-
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LOCKHEED

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ALL IN THE DAY'S WORK

THROUGH sunshine or rain, fog, sleet and snow, -TP Aero Motor Lubricating Oil keeps the engine running smoothly. It provides a margin of safety when unexpected weather conditions mean extra hours in the air.

-TP Oils are the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are produced from pure, paraffine-base crudes by a process for which patents are pending.

This process has marked advantages over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. There is positively no blending of light and heavy oils to produce various viscosities.

In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from fouled spark plugs, easy cold starting, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitudes—a maximum of safe flying hours.

A handsome, practical Pilot's Log Book sent free on request. Please use the coupon.

TEXAS PACIFIC COAL AND OIL COMPANY
FORT WORTH, TEXAS

New York

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-TP Aero Rocker
Aero Lubricant

A pure, paraffine base, low-
volatility, mineral-oil lubri-
cant. Free-flowing—will
not carbonize. Meets SAE for
lightest fuel oils.



-TP-AERO MOTOR LUBRICATING OIL
PATENT PENDING

Texas Pacific Coal and Oil Company, Fort Worth, Texas
Please send me, without obligation, your Pilot's Log Book.

Illustration 6.30

Name _____ Address _____

Your Old Dealer's Name _____

TRADE YOU for membership AVIATION



THE transfer of our personnel to new headquarters, on the seaboard, at Baltimore, is the first step in a program of wider service to the development of the art of aeronautics.

THE GLENN L. MARTIN CO.
Builders of Quality Aircraft since 1909
BALTIMORE MARYLAND



TRADE YOU for watching AVIATION



The plane sketched is a Buhl Sport Airspeeder, carrying pilot and two passengers. It is licensed for either the Wright Whirlwind J-5 or J-6 engine.

ONLY honest manufacturers endure.

For 93 years the Buhl name has been identified with progressive industry. That is one reason the Buhl Aircraft Company has assumed a position of acknowledged leadership in aviation. Its planes carry far more than the name alone—they preserve the priceless heritage of almost a cen-

tury of manufacturing integrity. Its sales and dealer policies are tempered by long experience and based on the sound business sense which assures profit.

We shall be pleased to mail our illustrated catalog of the complete line of Buhl Airspeeders, or to forward details of our attractive dealer plan.

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3 Points supporting *Pedrick* supremacy



- 1—MADE TO SPECIFICATIONS.** PEDRICK H-10-Shaped piston rings conform to the specifications of the engine designer. PEDRICKS are approved and used by many leading engine builders. We will send upon request a reprint of an article from the Journal of the Society of Automotive Engineers entitled "Important Factors in Piston Ring Design." It explains why conventional piston rings are best.
- 2—EVERYWHERE AVAILABLE.** The PEDRICK distributing organization is world-wide in its scope. Everywhere adequate stocks of PEDRICKS are in the hands of reputable mechanics ready to render service. Write now for the name of the nearest Distributor carrying a complete PEDRICK stock.
- 3—THE WELL KNOWN PEDRICK QUALITY** never varies. ALL PEDRICKS are H-10-Shaped—not to mention by heat. In this process every ring is made round from the start by machining a circular casting. In the last step of the process the finished casting is split and spread open the correct distance to give it the proper tension. Held in this spread position it is set to that correct shape by forcing it to 1200 degrees Fahrenheit. Because the setting in this shape under heat in the last operation of the process, the exact desired shape is always obtained. Furthermore, the shaping under 1200 degrees Fahrenheit removes all internal stresses which may have been set up by casting, cutting and machining—stresses which, if permitted to remain in the ring as in all other processes, would cause the ring to warp or to lose tension. But PEDRICKS can do more, even in the off-control type, than ordinary snap rings—25¢ each, and up.

Wilkening Manufacturing Co.
Philadelphia

THANK YOU for mentioning AVIATION

PHILLIP WITH PHILLIPS

- for easy starting at any temperature.
- for quicker take-off, faster climb and more speed.
- for more power and economy of operation.
- for less weight per gallon of fuel.
- for smooth, uniform and dependable performance.

The problem of even distribution of vapors to all cylinders of an airplane engine has been solved. Dangerous engine knocking—Thuds—Misses—more Thuds—don't happen when Phillips Aviation is used, for this super motor fuel vaporizes readily and completely under all conditions.

Phillips
AVIATION
NATURAL GASOLINE FOR
CONTROLLED VOLATILITY
PHILLIPS PETROLEUM COMPANY
BAYVIEW, OKLAHOMA

Phillips Aviation gasoline is the fuel for "new production" high compression motors. Used by outstanding air transportation companies such as Boeing, Robertson, Western Air Express, National Park Airways. Available at a steadily increasing number of airports. Ask for it when in need of service.

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Specify "Oxwelding under Procedure Control"

ONE of the most significant factors in the welding field is the attention being given to procedure specifications in important welding operations. Uniform dependability of the joint oxwelded under Linde procedure control has made it the most popular joint whose strength, tightness, and ductility in the completed weld are required.

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LINDE OXYGEN
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31 Oxygen Flows—32 Acetylene Flows—33 Oxygen Flows—34 Acetylene Flows—35 Apparatus Flows—36 Carbide Flows—37 Carbide Flows

THANK YOU for mentioning AVIATION

YOU WANT A Production Job



BECAUSE Fairchild sold more dollars' worth of commercial air transportation units in 1928 than any other manufacturer, Fairchild is far in the lead in the application of modern production methods to the manufacture of airplanes.

Every Fairchild "T" performs like every other "T" because these ships are built to rigid specifications of design, materials, and construction. All parts are interchangeable, including wing and tail surfaces. At its price the Fairchild "T" represents the greatest value in a single-engine transport plane now being offered to the public.

This is equally true of the "41" and the "42." Every

ship is flight tested before it is sold, and every ship carries an engineering log to facilitate rendering service to Fairchild users. We believe that Fairchild planes can be serviced more rapidly and more economically than any other planes now being built.

Whether you are a training school operator, a transport operator, or a business executive who is prepared to buy a plane, we submit that a regular production job will serve you better and more economically.

For detailed information concerning any or all of the current Fairchild models—the "41," "42," and "T4"—write or telegraph Fairchild Airplane Manufacturing Corporation, Farmingdale, L. I., New York.

THE FAIRCHILD "T" series plus other airplanes for tour, sport, mail, and commercial use. A larger passenger and cargo capacity (12 to 16) than any other 400 h.p. plane of its type. Folding wings. Flaps and ailerons. One hour four engine flight. Ground-speeding. Motor. Descriptive list. Full for high speed 170 m.p.h. Cruising range 700 to over 1000 m.p.h.

FAIRCHILD



AIRPLANES

THANK YOU for mentioning AVIATION



REFINEMENT OF DETAIL

WHEN flying becomes a business, good performance and an adequate factor of safety are not enough. Equipment must be capable of continuous operation with maximum reliability, minimum upkeep and with the least possible charges for depreciation, maintenance and repair. The consideration given these factors in the design of Knoll aircraft has been as thoughtful as the consideration given to performance. Makeshift construction has no place in the airplane which must operate at a profit.

The KN-1 is the product of an engineering staff of long experience and thorough training. It is built in a factory with every facility for quality production by an organization that believes the future of flying depends on machines which can be operated to show a profit.



The KNOLL
AIRCRAFT CORPORATION
475 West First Street
WICHITA, KANSAS

THANK YOU for mentioning AVIATION

PROGRESS/ the Series C "WASP"

Millions of miles of flying with the "Wasp" engine in commercial, Naval and Military operation, under all possible conditions, ranging from the frigid temperatures of Northern Canada to the other extreme of torrid tropical conditions, has created an invaluable fund of experience.

With this background and without radical departure from previous practice, our Engineering Department has developed and thoroughly tested the Series C "Wasp." This model has even better performance characteristics, greater dependability, and longer life than its predecessors.

We thoroughly believe that the Series C "Wasp" is the nearest approach to mechanical perfection yet obtained in any aeronautical engine. We invite you to inspect it at the Detroit Show.



THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD, CONNECTICUT

Manufactured in Canada by the Pratt & Whitney Aircraft Co., Ltd., Longwood, Quebec, in Commercial Range by the Revolution Motor Works, Montreal.

Wasp & Hornet Engines

THANK YOU for mentioning AVIATION



Consolidated Custom Radio Instrument
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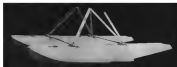


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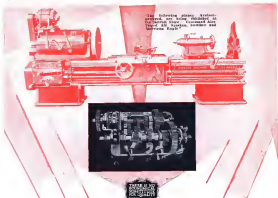
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THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

April 6, 1929

Volume 11 Number 15



Used Planes and Trade-Ins

ARECENT report from English aeronautical circles informs us that a British concern is now taking steps toward the establishment of an area flying company which will not only handle new aircraft contracts on new planes, but used planes as well!

While, perhaps, it is a bit too early in the game for American aircraft manufacturers to take considerable time out and make an intensive study of the used plane market in this country, it would be very much worth their while if they give that problem more than a passing thought. If production estimates for 1929 prove to be any where near correct there will be an awful lot of airplanes flying around one year from now. And a great many of the owners of those planes will give serious thought to trading them in for the next year's new model. Some will desire the new models merely to be at the head of the parade, while others, such as aerial taxi operators, will seek the new improvements as a means of attracting more business. However, as to the unsalable surplus, trade-in values will have to be quite attractive to enable a steady production of new models. But at the same time those values will have to be sufficiently low to permit a resale without too great a loss, if there must be a loss.

Therefore, the main point to be determined is, what is the actual dollars and cents depreciation of a plane that has been used under normal conditions? At the outset we'd say that on airplane depreciation at a rate rapid rate does an automobile. On the other hand, the initial cost of an average priced plane, ready to fly is more than twice the initial cost of an automobile. In short, with a higher initial cost and a more rapid value depreciation, because of a shorter useful life there will have to be a loss on a trade-in, borne by either the manufacturer or the owner. (As time goes on the distributor or dealer will take the loss instead of the manufacturer.) However, it stands to reason, that neither party is going to take the entire loss. So it behooves the engine manufacturer to start considering the used plane and trade-in situation, with the idea and expectation that when the time arrives he will be able to advance a proposition that will be fair to all parties concerned.

London to India

THE opening of the passenger and mail service from England to India is an historical feat of super importance. From the aeronautical side the starting of a five thousand mile passenger line is no small matter, but the real significance lies in the fact that it will have an instant relation between the mother country and its dependencies. The possession of the British Empire is an historical phenomenon, for no other country has ever been able to hold together an empire so widely separated, and for so long a time. The achievement is the result of English character combined with modern transportation which has allowed emigrants to go freely to the colonies, but yet return to the mother country often enough to keep the old customs and the old feelings of loyalty. As the colonies get more settled and firmly established, there was a tendency for the emigrants to remain in the colony and not to revisit the old country. This has led to a growing differentiation in customs and ideas which ultimately would have led to the disruption of the Empire.

In estimating the historical effect of the air link between the colonies, one must realize that the service to India is only a slight beginning of what some day will be a great system which will place all the colonies within a few days' travel of the mother country.



Spain to South America

SUCH has been the progress of aeronautics that a flight of more than four thousand miles non-stop has attracted only passing attention. To Spain, though, the first flight of Captain Jussieu and Captain Igloria has a deeper significance than it has to the rest of the world. The flight recalls to Spain the days when Spanish ships were masters of the seas. It recalls the days when all of South America was a Spanish province. It gives hope that the days of ancient glory will be repeated and that closer ties and more personal ties will be established. In any case, it is a flight of which Spain or any other country may well be proud.

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PROMOTING

Short Hop BUSINESS

IN SOUTHERN CALIFORNIA

A Standard Air Lines
"Golden" in
flight over Los Angeles

WITH the 1939 flying season at hand there is considerable speculation in some quarters as to the volume of "pay-day" traffic that two-place operators may expect this year. The great decrease in such business during the last few months of 1938 has been feared by some operators as an indication that the flying public is "fed up" on short pleasure flights and that the flying of the future is to be done principally over established airways when time dictates that the passenger employ the fastest available transportation.

Although we may always expect a seasonal decline in pleasure flying with the approach of winter weather, the recent fall probably points beyond a normal reaction to the weather and seems to indicate that the public is thrifty with flying, just for the novelty of getting at the ground. Thriving flights of all sorts have kept popular status at a lower level for the last two years with the result that thousands of people have taken short flights for no good reason at all except a natural curiosity to find out what it was all about. The airplane has now become so commonplace, however, that this sort of passenger traffic cannot be expected to continue. No one pays good money these days to climb in an airplane and ride around the block just for the fun of it. But there are millions of people who every day use airplanes, rental ones, or established bus lines because they want to go somewhere or see something. This seems to be the phase upon which the operators of aircraft is entering. For every passenger who a year ago took an airplane ride for the thrill of "fleeing the age,"

there are probably at least 10 who can this year ride for reasons of sane pleasure, scenic enjoyment, social desirability, or business necessity.

Of course we will have "first timers" as long as there are 2,000,000 new Americans born every year, but most of these youngsters will probably be getting their first ride in connection with aerial courses of Sunday School classes, or some equally prosaic introduction.

The point is that the operation of aircraft is no longer a romantic adventure and the small operators of the future must adopt the more modern and constructive methods of doing business. If operators are to enjoy a continued growth and prosperity it seems imperative that all two-place operators should recognize this situation and make every effort to face the 1939 flying season with a well thought out program for stimulating and serving every legitimate source of traffic. In the past almost every effort of flying has taken its first ride in a small gas plane and thereafter has become a prospective flying student, aircraft purchaser, or transport airline patron. There is every reason to believe that intensive promotion of pleasure and scenic flights will bring heretofore unheard-of profits to the small operators and will make possible the continued rapid growth of the entire industry.

There are a great many established aircraft operators in Southern California and the resultant competition has brought rapid development of traffic promotion methods. While these methods are not necessarily superior to those employed elsewhere it is hoped that an analysis of them will prove valuable to two-place operators generally.

One of the most commendable features of operations conducted in this territory is that the operators have formed a co-operative organization known as the California Aircraft Operator's Association, and through this medium they strive to advertise aviation and encourage flying generally. Further than this they main-



tain a central office through which all business is handled so that a charter customer, for instance, who finds a particular operator unable to serve him for some reason or other, is referred to the central office and from that point is placed in touch with a member operator who can give the service required.

Another factor in the success of the California Aircraft Operator's Association is that each member has sought to specialize in a type of traffic not handled by any other operator. This method gives each operator a legitimate phase of traffic premium without encroaching too severely on some neighboring operator. For instance one operator will concentrate on traffic from commercial organizations, another seeks only Eastern tourists, another goes out after women's club and social organizations, a fourth specializes on flights for school children, and high school flying club members. The result has been a greater total volume of business and a certain degree of prosperity for all of the associated operators. Within the Association regular meetings are held and problems are placed before all the members for solution. This has brought better publicity, closer co-operation with the city, state and national officials who may have any connection with the operation of aircraft; better methods of handling local traffic, and many other very real and valuable improvements in business methods.

Of particular significance is the fact that aerial stunts, performed in street crowds to the surprise, have been almost universally abandoned in Southern California. The most popular flying fields and the ones in this district that are doing the greatest volume of business are those who were the first to ban parachute jumping and violent stunts over their fields. While these exhibitions undoubtedly have a place in connection

with specially arranged programs, not intended to boost passenger flights, they should certainly be abandoned as a method of traffic promotion. No other form of misrepresentation depends for its traffic on schools for attracting huge crowds to the main terminals, the plan universally employed being that of going direct to the group who should be interested in traveling by the system in question. This is the technique now being used by aircraft operators of this territory. Each operator analyzes his available sources of traffic and then finds some method of appealing directly to those sources.

It is, of course, not always possible to accurately forecast either the type or the volume of traffic which a given operator may anticipate. It should be possible, however, for any operator to investigate all of the sources of traffic in his locality, enjoy himself for the particular class of passengers which seems to promise the greatest volume of traffic, organize his flying around to particularly appeal to this class, and then develop specialized methods of advertising which will reach the desired group, or groups, with the least possible waste. Particularly should it be possible for an operator with one or two seasons of flying experience behind him to review the type of passengers who have brought the greatest volume of profit, and to the future to concentrate on the phase of flying which will further encourage this profitable traffic.

Southern California is particularly fortunate in having a great many different sources of short-hop traffic. Foremost of these are the thousands of tourists who annually visit the West. Then the great oil boom in the southern part of the state has brought a flood of traffic from persons who are interested in the oil well situation and wish to fly over the territory for a comprehensive view of those sections under development. Still another profitable class of traffic has been from the real estate operators and prospective purchasers, thousands of whom have been flown over subdivisions or real estate developments. These groups are not representative of what other operators throughout the country should expect in the way of traffic, but they do serve to illustrate that each particular sector may have sources of traffic peculiar to that locality, and which the aircraft operator can cultivate with profit.

While week-end and holiday pleasure seekers will probably always furnish a reasonable income for one or two days of the week, it is the consistent volume of traffic maintained throughout the seven-day period that



gives the operator his profit and it is here that group analysis is of the greatest help. Women's clubs and societies, sales organizations, chamber of commerce groups, gymnastics clubs, student groups and student aviation clubs, groups of factory employees, tourists, and many other classes of people may be induced to fly during week days, and in very considerable numbers.

Dyer's Airport, for instance, has developed a steady volume of passengers from among men's and women's gymnastics classes, and from ladies' sections of various sorts. Although this airport is located several miles farther from downtown Los Angeles than a number of others, representatives of the Company go directly to the people whose patronage is sought, arrange for a group flight on a given date and if necessary arrange for the transportation, thus assuring that those people will derive the extra miles to the airport that make the enterprise so well worth the pains.

Another significant example of group analysis is reported by P. M. Goddard, of the Palo Alto School of Aviation. While dinner located on the campus of the Stanford University in the nearest part of the state Mr. Goddard was on campus, why routine flights should not appeal to young college students and arranged for such a service at slightly higher rates. He reports that the success of this initiative has been nothing short of remarkable and there seems no good reason



Plan Your Airplane to Promote here the American Aircraft Corporation, field at Los Angeles, Calif. Flights of this type can be a great inducement to the aviation program presented there.

why college students anywhere should not be induced such an aid to romance.

A special flight for while families has proved a happy thought for the Glendale City Airport, west of Los Angeles. This field is located in a quiet neighborhood, not characterized by a great many wealthy families. By encouraging entire families to take some trips together, a steady and profitable source of traffic has been developed. Bold American planes provide the luxurious comfort which especially appeals to this class and the novelty of the service has proved almost self-advertising, each family seeming to tell its neighbor on the trip.

Another service which offers the greatest possibilities to two-plane operators everywhere has been developed by the Tanager Motor Livery Co. In this case as

analysis of tourist traffic led the Tanager Motor Livery, to add an Air Livery service to the parlor car and limousine service which has been provided Extraordinary for a number of years. The Tanager Motor Livery operates 20 to 30 limousine cars over eight regular scenic routes, and 200 limousines with chauffeurs who drive these customers who seek a more exclusive mode of transporting. Two of the parlor car routes include Clover Field, Santa Monica, in their itinerary. The Air Livery division was established in Clover Field with 10 vintage cabin planes in total equipment and a combination bus and cabin plane tour was advertised. The traffic has been sufficient to warrant doubling the number of cabin planes used, within the first six months of operation. Several buses are operated over the two lines which pass Clover Field. These arrive at intervals of 15 or 20 minutes and thus provide a steady volume of air traffic throughout the afternoon, and on every day of the week. Those passengers who do not take the night are shown about the field by a guide. Passengers on other divisions of the Tanager Motor Tours are told about the combination bus and car tour and many are thus induced to take advantage of it. Chauffeurs of the 200 limousines are also given a commission for all passengers that they bring to the field and much traffic has resulted from this source.

The logical development of the above service would seem to be for every operator who can, to make arrangements with neighboring bus companies to bring their passengers to the field for a scenic air tour, a far commission being paid to the bus operator. Limousine and tourist operators

could also be induced to bring passengers to the airport if they received a commission on all passengers so obtained. Some local operators are finding bus and limousine combinations a good source of traffic in seasons. It is not necessary to provide an limousine cabin plane for this service as the exclusive tourist traffic demands but the equipment must be able to get in and out of small fields or high altitudes in order to do this. Mountain resorts to which the club members desire access. The Alhambra Aero Corp., Long Beach, is located near a very considerable colony of retired business men who live at the beach for purposes of health and recreation and are willing to pay a premium for rapid transportation to the mountain resorts. This trade has been greatly increased by the Elbert Co., through the purchase of an American Alhambra eight place cabin monoplane. It is not particularly difficult to arrange for good landing fields close to mountain resorts in most parts of the country and this class of traffic will probably experience a most satisfactory growth in the near future.

It is not always possible for an operator to get the inside track on business and crime groups, but if any good approach can be arranged it is almost sure to be profitable. The American Aircraft Corporation of Los Angeles is particularly fortunate in this respect in that the president of the company, Theodore T. Holt, is also a vice-president of one of the leading downtown banks and is, in addition, a prominent attorney. Through his group associates he has been able to encourage flying among business executives and various business groups. This type of traffic usually results in much valuable publicity also.

A very profitable source of business has been developed by the Aero Corporation of California directly

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as a result of analyzing the passenger field. This company found that on one operator was sympathetic to flights for student groups, and therefore devoted considerable attention to the development of such traffic. Representatives of the company were sent to all the high schools of the city to assist in forming high school aviation clubs and the students were invited to the flying field and shown through the shops and hangars on special days.

On these days students pilots were in regular and the result proved to be an enormous volume of traffic from this source. The lower prices were (suggested) for the fact that the passengers were so small that three could normally be carried in a two-passenger

open plane when we have cabin planes of the most luxurious sort now available.

Field equipment and the air trip itself should also be given considerable thought. Some fields may prosper without spending much money on landscaping, passenger waiting rooms, and other field improvements, but in general the field where an much attention is given to keeping the ground equipment presentable is so given to the scientific and maintenance of the flying equipment, will prove the most popular. Still again, it may be that some operators can profitably operate operations for an indefinite period without offering anything other than a "ride in an airplane" but for the most part it is the operators who develop and exploit scenic routes over particularly attractive portions of the landscape, who will enjoy the most profitable trade. Clinic tours, beach trips, flights over nearby aviation centers, or even on flights could be led out on maps of the locality, suggest a definite flying time and price per passenger, and then be advertised to prospective passengers.

An excellent example of how it is possible to build a steady and profitable traffic chiefly by so organizing both equipment and flying service is found in the history of the American Aircraft Corporation. This company secured a good field by complete grading, a heavy sowing of grass, and provision of an underground sprinkling system, thus entering a completely dry hot country. Attractive individual hangars, a show lounge, restaurant, picnic room, motor hotel, office and administrative building were all painted white with blue trimmings. The entrance from the main highway is well drained and inviting in any weather, while whatsoever sleek border and decorative border became a picture which has proved attractive.

This public interest is kindled at American Airport by giving the most complete personal service to customers. Entertainment is provided spectators by a loudspeaker system which broadcasts radio music along a half mile front. Pilots and field attendants are picked for their ability to please the public, an addition to the ordinary requirements of such a business, and they are though be were being conducted on a personally one-to-one basis. Assistance is given in dressing helmets and goggles, and passengers are helped in and out of the planes by attendants. During the flight every attempt is made to give a smooth ride without quick ascents or sharp descents and the pilot occasionally operates the engine while he explains points of interest to the society. Another service which is proving extremely popular is the practice of seating pilots in a formation, two or three taking off and flying together.

The American Aircraft Corporation has arranged flying special trips and named the pilots to fly various routes over beaches, mountains, Hollywood moving picture studio, various oil fields, and other points of interest. Night flights and moonlight rides are also regularly conducted with excellent results. The result of this complete personal service to the passengers has been a constant repeat order business and the development of a clientele of customers who realize regular use of the profitable charter service.

The Harry Steel Airplane, adjoining American Field on the north is also a good example of a field where the good landscaping and the special attention to the architecture of the field building, which has been one of unique oriented structure. Lincoln Air Lines, north of the Steel field, has installed a large



reciprocity. Of course it is necessary to have these students bring notes from their parents which accompanied by a responsible adult. Any good three place plane is ideal for this traffic as the younger people do not object to a small or even, but on the contrary rather enjoy it.

One drawback of the aviation rides which should interest every operator is that almost every student who has taken a flight at the reduced rate returned shortly with a complaint, or with parents or relatives who he had induced to fly at the regular rates.

It may be that an operator will be limited as to his traffic by the type of equipment which he has available. On the other hand it is essential that both ground and flying equipment, and personnel, should be carefully selected and organized to serve the class of patrons whose business is sought. There are now on the market open planes of four to five passenger capacity and closed planes of from one to perhaps 20 passenger capacity. These planes vary widely in performance and equipment and an operator should therefore be quite sure of the demands which will be made upon his plane before any considerable purchase is made. Students, school and pleasure seekers, and many people of moderate means may be perfectly satisfied with the light open plane. On the other hand it is not good business to expect wealthy business men or tourists to cramp themselves into an

and will kept low between the takeoff apron and the spectator area, thus increasing the spectator interest by obscuring dust and making the field pleasant to look upon.

Excellent use of the radio broadcast loudspeaker system is made by Bager's Airport, adjoining American field on the south. Here the loudspeakers are strung out for miles thus hold a male and a field attendant given regular radio talks over them between programs of radio music. This employment of loudspeakers seems to have many merits, for it helps to drown the noise of the planes, makes it possible to page any employee, pilot, or customer who may be at some distance from the administration building, keeps the ground attendant, and given the operator a chance to talk directly and at some length



A dinner party about to leave the field of American Air Corp. in a Western radio airplane.

with an audience of several hundred people who are in a receptive mood. It will probably prove a profitable investment for almost any operator to install such a system.

That planes should be kept clean and should be displayed neatly on the field is almost an axiom of taxi-plane operations. An airplane laundry rack developed by the Aero Corporation of California has made it possible to quickly wash an entire airplane and put it back on the line. Every plane operated by this company is so washed at regular intervals, and the resultant impression upon the general public is that the planes are all brand new and in the most perfect condition, which in fact they are, but it would not be apparent if they were covered with grease and mud.

Other companies who have made a wide appeal by getting a number of official service items include the California Aero Transport Co., and the Mutual Aircraft Corporation. The former company has arranged a 100 mi. circle tour of the Los Angeles area and by concentrating on this one trip has been able to build up a very good volume of traffic. Of course there are other types of field, as well. The Mutual Aircraft Corporation, through its operation of a night express route between Los Angeles and San Francisco, has gained much valuable information on night flying and has ample night flying equipment available. Short night flights have therefore been inaugurated by this company with very considerable success. It is interesting to observe here that whereas a year ago there was not a regular night service offered anywhere on the coast, now there are many such, and almost every operator will do night flying if requested. With better field lighting equipment and the increased use of lights on planes, this class of plane flying may well become one of the leading sources of business.

Although such large operations as the Western Air Express and Madsen Air Lines are not directly com-

parable to the average airport conducting a pay trip and charter service, nevertheless these two companies have developed a type of service which many smaller operators might well copy. Western Air Express arranges for round trips between Los Angeles and San Francisco, with one way by air and the other by ocean steamer; while Madsen Air Lines provides such a service except that the return trip is made over a scenic bus line. In either case the round trip fare is lower than the corresponding two one-way fares. These routes are to be held here for the development of short airplane flights to resorts at lakes, rivers, mountains or ocean, the passenger flying out and returning at his leisure by means of surface transportation. Although such service enters the realm of regular transport operation, will it not be hardly be classed with the larger companies operating by planes over long distances, and will probably become a regular phase of taxi-plane operation in the future. Certainly it would be to the advantage of the airport operator if such a service might be advertised and arranged for through the field agencies of railways, bus lines, steamer lines, and electric car agencies. It is apparent that future development of taxi-plane traffic will depend largely upon better personnel service, more complete planning of routes and schedules, and a very high degree of field organization and equipment selection.

Having organized for a selected type of traffic there still remains the problem of how best to advertise the service offered. Probably every operator in the Southern California area now advertises flights from a scenic, social, educational, or business viewpoint. Their or-



An original work rack for planes, which was devised by Walter Hamilton, vice-president of Aero Corporation of California.

novity are not even considered. Prospects are sold on the desirability of moving mountains, islands, forests, or fields, industrial districts, etc. from the air. Contrary to popular opinion, the most successful advertising campaign is placed on the fact that as airplanes can go further in less time than any other form of right-angle vehicle, and that the visibility in all directions is multiplied as though one were on a very high mountain peak. Last, but by no means least, a comparison is made between the dusty, dirty, heated motor bus or auto, with its insupportable traffic delays and dangers; and the airplane riding smoothly and luxuriously through the clean blue sky above a scenic landscape of changing panoramas.

In getting this message over to the public it is necessary to adapt the type of advertising to the group which is being particularly appealed to. A field located on a leading boulevard can afford extensive loudspeaker systems, large and attractive advertising signs on the property, illustrated folders for distribution among visitors,

and a direct salesman to mingle with the visitors and sell them tickets while they are in a buying mood. On the other hand a more isolated field may resort to direct mail advertising to select groups, advertising over the radio, in the newspapers, at neighborhood theaters, an indirect advertising placed through the services of a publicity man or by showing features to newspaper men in return for stories. In general it seems true that the operator gaining the most favorable publicity enjoys the greatest volume of patronage.

Of course on items of advertising dominates the necessity of personal contact. The final ticket sale, and in most cases the final decision to fly at all, must be the result of direct personal selling. For this reason it is necessary for the operator or his representatives to constantly contact business groups, give talks before luncheon clubs, student organizations, and in some cases conduct at least once in a while courses of some people whose he has reason to believe should be customers of his.

The Aero Corporation of California has done much of the direct personal contact work through Fred Hutton, advertising manager, as well as other members of the company who give other direct talks and welcome any opportunity to speak to any group on the subject of aviation. Mr. Hutton has devoted much time to visiting student auto clubs, helping to organize them, and arranging special events or flights for them, and has found this one of the most valuable forms of direct advertising.

With regard to the placing of traffic indicators out on the line of operators, this practice is now followed by almost all operators in this territory. Records of the Aero Corp. show that after placing two good indicators on the line a little more than a year ago, business increased more than 700 per cent within four months. Much the same results are reported by Bager's Airport; Don Cardiff, West dealer at Bakersfield, and several other leading operators. It is essential that these men who come in contact with the operators should be polite and affable and should resist attempt to sell the product as aviation is general truth to high pressure but not a fight against you.

An excellent form of indirect advertising is employed by the Eddie Martin Airport, Santa Ana. Over a year an aerial breakfast is held at this field, which is attended by aviation celebrities from all over the state. At the same time civic leaders from surrounding towns fly to the function and much favorable publicity is thus created. Then at regular intervals during the year this field arranges special flights for chambers of commerce from the surrounding towns. The flight is given at greatly reduced rates and brings no direct profit, but the resulting publicity through the newspapers, and the privilege something to Spring leading business men, has proved an excellent way of increasing traffic.

Since much of the American Aircraft Corporation's



The shops and hangars of Aero Corporation of California and Standard Air Lines.

business comes as a result of repeat rides, this company goes to great length to provide every passenger with further information about the field and the services offered. Several well illustrated folders have been prepared and are given to each passenger. In addition there are attractive signs on the sides of the hangars telling of other scenic flights. There is the waiting room there are many photos of American Aircraft planes and pilots, both on the ground and in the air, and aerial views are displayed of points of interest seen by passengers on the various scenic tours. This direct appeal is customers is comparatively cheap advertising and brings a steady flow of profitable repeat.

Sometimes direct publicity stunts can be arranged at very little expense. For instance the Aero Corporation of California has on several occasions supplied others of downtown Los Angeles theaters with complete window tags for new during the showing of an air picture. In return the theater permits signs on the foyer telling the public the name of the aviation company supplying the equipment, and of even greater value has been the fact that the owners were by the exhibitors carry in large letters the name of the flying company supplying them.

Still another form of theatre advertising used with success by the Aero Corporation has been the planning of an Aero Corp. night about once a month at certain neighborhood theaters. The free tickets for air rides may be given in return for permission to show a film depicting activities at the field. Not only does the publicity bring away patients but each free ticket usually brings a pay passenger along.

Direct newspaper advertising has been used with good results by the American Aircraft Corporation; the Associated Aircraft Corp.; American flag distributors; and some others. Where this newspaper advertising is employed it is essential that some particular service be stressed and the ad should read more like an advertisement on either the travel page or the sport page of the paper.

In general it is probably necessary to advertise aviation more than any other service or commodity offered the public. This is in spite of the almost unlimited publicity which the industry has received. The answer is that the average man is not used to buying air transportation and inherently resists against it. In finally overcoming this natural reluctance to do business there seems to be no form of advertising which can equal direct personal contact.

The above methods of traffic promotion represent some of the best efforts of an area which is now enjoying a greater per capita air travel than any other section of the world. Nevertheless, it is certain that in analyzing traffic sources, organizing to serve special types of traffic, and advertising the services offered, the airport operator can learn much from long established transportation companies who have faced these problems in the past. Methods in the aircraft operating industry are still very slowly and the operator who can best apply it to spread the word and who has been learned on the ground will undoubtedly reap ahead.

THE "AEROTRUSS" BRAZED "U" Channel

SECTION



A high resistance test load of rib is applied to an "Aerotruss" rib without failure of members

Largest Company of Los Angeles plans immediate production of new type of member to meet the requirements of individual manufacturers

SUCH progress has been shown by the "Aerotruss" brazed "U" channel section steel rib recently developed by the Largest Company, a subsidiary of the Eastern Steel Co., of Los Angeles, that plans have been laid for the immediate production of this type rib in large quantities. Engineers of the Largest Company are said to be in touch with more than 30 large aircraft factories throughout the world with a view to supplying ribs developed to meet the special requirements of each individual aircraft builder. It can be accomplished it is believed that material economies will be effected by undertaking large scale production of certain structural units within a single factory, much as such methods have been found practical in certain phases of the automotive industry where some builders specialize on frames, others on bodies, brakes, axles, etc.

The channel construction, as developed and tested by Largest engineers, seems to indicate marked advantages for other aircraft structures than ribs, and is being developed for spars, bulkheads, internal struts, compression members, and various places within the structure of the airplane. If these developments prove successful it may result in popularizing the "U" channel steel types construction throughout the aircraft industry. Certainly steel has many advantages for use in the modern airplane, and since the U channel is a particularly simple type of section to fabricate, weatherproof, impact, or repair, it will indeed be a happy circumstance if this structure may be proved completely practical for aircraft construction.

Although many attempts have been made in the past to apply the U channel to rib and spar structures, the chief difficulty has been that riveting weakened the joints and welding was anticipated because of the thin gauge metals used. The reason claimed for the Largest structure is said to be entirely the result of a new method of low temperature brazing, the brass being accomplished by an automatic machine which applies the heat momentarily only. Since the maximum bearing temperature used is 1,000 degrees F. it has been found that this process has a negligible effect upon the strength of the material, even where the gauge runs as low as 0.010 in. A special formulae house wire is used for this brazing process, in order that the bronze may melt at exactly the right temperature of the heating torch and the metals being joined. By a dipping process there is just sufficient flux placed upon the bronze wire to insure a perfect brace. Although the heat applied is comparatively low and is momentarily applied by a rotary torch, it has been found sufficient to sweat the brazing metal completely into the joint and insure a perfect bond between the metals over their entire adjacent surfaces. The latter result is particularly advantageous because it distributes joint stresses over a much greater area of metal than is possible by riveting or by welding, where stresses are necessarily somewhat localized.

In the ordinary Largest steel truss ribs, U channel clip strips of SAE specification 3010 cold rolled steel are relied to an approximate curve by means of a specially developed triple roller. The clip strips on the 5 lb. Clark-

STEEL RIB

Y rib are of 0.005 in. gauge and the webs of 0.010 in. gauge, both channels being 1/16 by 3/16 in. in diameter. The web truss is stamped, cutback, and folded by machine, and is a single piece of channel in front of, between, and in rear of the two spars. Separate flange channels are stamped to form the spar spacing on the rib, these members being manufactured in several different types for attachment of the rib to wood or metal spars. The rib is assembled in a steel jig of accurate dimensions and so constructed that two men can manipulate the entire jig beneath the rotary brazing machine and quickly brace every joint on one side. The rib is then removed from the jig and the opposite side is braced. Tests have shown that two men can brace a 5 lb. Clark-Y rib in 4 min. and 10 min. by this process.

Since the success of this method of construction depends entirely upon the brazed joint, numerous tests have been made to determine the permeability and strength of these joints. In a tear test on a joint between a 0.015 and a 0.010 gauge, 3/16 by 3/16 in. U channel, the thinner metal pulled apart at a strain of 402 lb. ap-

proach for each vibration. This was accomplished by means of a double eccentric on the shaft of an electric motor placed midway between the two spars, six bars inserted and the whitstone applied to the lower clip strip by means of a handoperated steel plate clamped to the strip and against which the eccentric operated. After a run of 48 hr. and 20 min. continuous vibration the rib was minutely examined and no evidence could be found of fatigue in the joints or metal, or of any damage of any sort to the rib. The rib was then placed in a static test stand and subjected to loads totaling 440 lb. applied according to the Navy high resistance loading conditions. Maximum deflection at a point midway between the spars was 3/16 in. but no failures resulted in the structure. The weight of this rib was 774 oz. and the weight-strength ratio was shown to be in excess of 591, which is said to be considerably higher than the average wood rib of similar dimensions.

A further static load test was made on a 48 in. Clark-Y rib weighing 706 oz. In this test, load was increased to destruction, according to the Navy high resistance loading, the second diagonal member in rear of the front spar failing in compression as a column at a load of 418 lb. and after a deflection of 1/2 in. midway between spars without failure. After this failure the 48 in. rib it was found that the structure would still support a load of 260 lb., demonstrating the reserve strength of this type rib. Strength-weight ratio for this rib was 677, which is exceptionally high.

The largest rib weighs approximately the same as standard wood ribs of the same size. Its cost is said to be an added feature.

Much experimental engineering is now being conducted as an attempt to apply the new rib structure to spars, bulkheads, etc., in order that these units may be standardized and manufactured in quantity. Several particularly promising developments have been made with the rib itself in making it applicable in wing structures of wood or metal, and cover material of cloth, wood, or metal.

In the normal rib as first developed, the clip strips are simple "U" channels with the open sides facing in and web struts braced into the spar "U". Attachment to wooden spars was first provided for by fitting with wood the "U" channels which formed the spar spacers, and then nailing through the wood and metal to the ribs. A more practical method seems to be a shaped "U" channel spar hole framing which permits nailing the flange



The "U" channel of the rib braced and other members are also after being bent, the function between clip strips

approximately 80,000 lb. per sq. in. but the brazed joint was not damaged. Numerous tests have proved that it is impossible to move the joint itself, even by means of a nut, unless the test is applied uniformly around the entire joint so as to rock all of the braze metal. A vibration test of the most drastic character had no effect at all upon the strength of any joint in the rib and it seems highly likely that a wing rib could ever fail from this cause. In this test a Clark-Y rib of 5 lb. chord was loosely mounted upon two false spars and subjected to a vibration rate of 2,600 per min. with a deflection of 1/64



A "Aerotruss" wing rib being subjected to a test of 1,000 vibrations per min. with a deflection of 1/64 in.

directly to the spar by means of holes punched in the flange during manufacture. The leading edge is attached in a similar manner to a flanged U channel by using through the flange, or in the case of a metal leading edge, by riveting. Trailing edge construction permits use of steel cable, steel tube, or V metal strip without altering the rib. Two steel tube are permitted to project slightly in the rear of the rib and these may be readily bent around the tube or cable to hold it permanently in place. A V strip is also manufactured by the Largest Company for use on the trailing edge, and is applied by slipping the tube on the rib through slots punched in the V strip during manufacture. When these ribs are bent around the V strip they have proved of more than ample strength.

For plywood covered wings a rib has been developed in which the "U" channel cap strip is reversed, the web members straddling the "U" channel at each joint. The inverted U is filled with wood which is fastened in by pins through wood and metal, and the plywood is nailed directly to the wood filling.

Another development is an inverted and straggled "U" channel cap strip as constructed that cloth, wood, or metal covering may be attached to the rib.

For plywood cover the channel is filled with wood and the plywood nailed directly to it as described above. For metal covering the material is riveted directly to the channel flanges. For cloth an ingenious arrangement has been worked out which may prove of value in reducing the weight of covering. Instead of covering the rib twice completely around the rib and upper and lower cloth covering, this rib attaches the cloth directly to the cap strip flanges, upper and lower surfaces being independently attached. The flange on each side of the "U" channel cap strip is slanted with depressions every two inches from the trailing edge. Needle holes are punched at each side of these depressions in the flange in such a way that a needle may be passed along the flange, through the flange holes, and alternately above and below the flange. Depressions are staggered on opposite sides of the channel and the depressions of one attachment mesh exactly. In fastening the cloth cover to the cap strip a reinforcing strip is first placed along the cloth above the rib. Then the attachment is made by passing the needle along through the flange depressions, first passing the cloth into the depressions in order that the needle may sink the cover to the metal. The cover strip is then applied in the customary manner when the wing is doped. Instead of needle and twine it is thought that a metal wire might be used for this stitching. While this method of fastening seems to hold promise of economy in manufacture and repair, it will probably stand considerable flight testing first in order to develop this system to the point where it may be considered practical for use generally.

Excellent compression ribs have been developed by bending free flanged U channels to an ordinary rib, between the spars. One channel is brazed on each side of

the web members, top and bottom of the rib, the resultant rib being exceedingly strong and yet light and comparatively simple to manufacture.

Manufacturing methods so far developed consist of special triple rolling machines to produce the U channel with the approximate airfoil shape desired, special stamping, machines for stamping, rolling, and cutting the web members, light and accurate steel jigs which permit rapid assembly of the rib parts, welding benches, the automatic entry bending bench, and quick removal of the rib for completion of the bending process, and perhaps most important of all, the rotary brazing machine which makes it possible for the present plant to turn out 600 ribs per day if necessary. This brazing machine is a development of the lead brazing torch, it is said, and assures that just the right temperature will be produced for a perfect bond. The torch is mounted so that it rotates constantly, the braze brazing wire also rotating, and in such a manner that the torch and wire come together, at the spot to be brazed, large enough to melt the braze and produce a perfect joint. Of the almost impossible in the success of the steel rib is the process of endplate plating which is applied after completion of all brazing. This is the standard Ulysses process and throughout the industrial world. It produces a protective coating and is to three times as effective in resisting corrosion as any other plating or painting system that has yet been devised for the protection of steel. The resulting plate is about 0.001 in. thick, costs approximately five times per rib, and is said to make the rib immune to the effect of salt air or normal salt water exposure, for all practical purposes.

Patents have been applied for on all original phases of this new development and engineers of the Emco Steel company are co-operating with the Largest Company in looking to give the new structure a practical application to every possible phase of modern aircraft construction. In addition this "U" channel structure developed by the Emco Steel company is said to be interested in the development of a new type aircraft Ducted engine, working models of such have been constructed, and also in the development of large amphibious flying boats for use on the Pacific Coast. E. M. Smith, president of the Emco Steel Co., is a director in several western industrial enterprises, including a number of new aircraft factories and aircraft engine firms. The Emco Steel Co. is considered one of the largest industrial organizations on the Pacific Coast and has ample funds to conduct any reasonable operation in the manufacture of aircraft or engines.

The Largest Company is operated as an entirely independent subsidiary of the Emco company, is an effort to develop new structural methods which may grow of value to other Emco units, and to the aviation industry at large. Officials of the Largest Company are: E. W. Largest, factory manager and chief engineer; W. E. Marchant, general manager; and William J. Waterhouse, consulting engineer.

THE USE OF *Radio* IN SAFE FLYING

By F. C. HINGSBURG

Chief Engineer, Airways Division
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F. C. Hingsburg

improved instruments aboard airplanes, making it possible to fly safely with regularity regardless of weather conditions and visibility.

Modern airplanes are being designed for cruising speeds in excess of 135 m.p.h., having load factors which make them airworthy under weather conditions encountered more than 90 per cent of the time. Flying under the conditions of poor visibility is a problem that now confronts the air transport industry and one which must be solved to solve.

The Weather Bureau is making preparations for establishing a system of gathering the weather from secondary sets for the more frequent perception of weather maps from which to forecast weather. The Airways Division has established air navigation facilities between Cleveland and New York, by which reports of weather and landing conditions are gathered along the route each hour and broadcast from radio stations. Radio direction is being provided to guide airplanes over a safe route from the point of departure to destination. In the future, a radio altimeter and artificial horizon mounted on the airplane is destined to make flying safer.

AIR TRANSPORTATION has established itself as our complex system of civilization in competition with other forms of transportation and, at the present time, there are 50 air transport companies flying on regular schedules, aggregating 40,000 m.p.h. per day in the United States. Twenty-seven of these companies carry mail over the lighted airways and about 15,000 m.p.h. of flying takes place each night. The air navigation facilities established by the Department of Commerce on the lighted airways consist of 34 automatic leading lights spaced 30 mi. apart with intervening beacons at 10 mi. spacing. A flying efficiency of approximately 90 per cent is possible under the system of aids to navigation.

A double schedule was started on the Transcontinental Airways on the first day of this month. It was gathered at the close of one business day on the Pacific coast is delivered 36 hr. later on the Atlantic seaboard, the mail being in transit two nights and one day. Plans under way promise for the operation of large passenger airplanes over practically all routes. The success of these services will depend very largely upon safety, reliability of flying and percentage of completed trips on scheduled time. This can be assured only by the use of radio, a more comprehensive weather service and

Fig. 1—In the radio range house at Walling Field, N. H., showing aids and post connections for line stations.



under conditions of poor visibility when instrument flying takes place. Landing blindly by instruments in thick weather will require the use of radio beacons and landing directions from airports must necessarily be given by radiotelephones.

There are several systems utilizing radio suitable for guiding aircraft in flight under conditions of poor visibility. The directional radio beacon appears most suitable for a system of airway routes and three radio range beacons of this type are now operating on the Cleveland-New York Airway. These beacons are established at Hurdley Field, Bellefonte and Cleveland and transmit signals on frequencies in the 285-315-kc band. The antenna system is supported by a vertical pole and is the equivalent of two loops spaced 120 deg apart. The pattern of the signal for each loop is the figure eight, and since the loops intersect at 120 deg, the patterns overlap. The transmitter sends out a signal on each loop in sequence and in such a manner that the overlapping pattern interlocks, creating a prolonged dash at the points of equal signal strength by combining the two signals. By means of a governor, the pattern of each signal can be shifted across the beacons to radio-mark the airway routes. There are normally four interlocking

loops, thereby heading the course at the beacons to coincide with the airway courses leading out to Hurdley and west to Cleveland. The patterns of equal signal strength are shown on Figs 5 and 6 and the interlock takes place at the points of intersection of the curves which are made to coincide with the courses to be radio-marked. The directional radio beacon is shown in Figs 1, 2 and 4.

To take advantage of the radio beacons for guidance of airplanes, the airplane must be loaded, shielded and equipped with a simple receiver combining high sensitivity with a minimum number of radio tubes and small power supply. The receiver and battery supply should weigh approximately 18 lb. The receiver should have a single tuning control mounted on the instrument board and an adjustment whereby the signal intensity can be adjusted by means of a knob in the control panel. The pilot receives the signals by means of ear phones placed in the helmet. A vertical antenna is used on the airplane.

The pilot follows the course over the airway and receives the radio signal from the directional beacons. The signals from the two loops interlock with equal intensity as the route forming continuous dashes. Should the pilot drift to either side of the course, the directional signal from one of the loops increases in intensity, and, knowing the characteristics of the signal on each side of the course, the pilot automatically pulls back on the yoke and follows the radio marked channel to his destination. Marker beacons are established at principal



Fig. 1—The 1-kw. transmitters, telephone apparatus and high frequency oscillator at Cleveland, O.

intermediate landing fields and at the change of course. The marker beacons of low power and short range transmit in characteristic signals on the same frequency as the adjacent radio range beacons and serve as a land mark along the route. Six additional radio range beacons are being installed at Boston, Galesburg, Ind., Sterling, Ill., Des Moines, Iowa, Nels, and Galesburg, Neb.

The Airways Division operates, in conjunction with the Weather Bureau, an disseminating weather information along the airways, and maintains 28 radio stations for the exchange of weather information and the dispatch of airplanes. This system of communication is supplemented by telephone and teletype for point-to-point communication. Three radio broadcast stations

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are now operating at Hurdley Field, Bellefonte and Cleveland, and broadcast weather information and landing conditions at the airports and principal intermediate fields along the route each hour throughout the day and night. Fig. 3 shows the Airways Division standard radio communication station apparatus. The telephone transmitters are 2,000 watt capacity, broad-

casters an alternate field and land with safety to discharge passengers and cargo or to avoid more favorable weather. The direct co-operation is maintained by means of teletype communication between the operations manager of the transport company and the Weather Bureau office. The radio broadcast stations established by the Department of Commerce will accept any message

Fig. 4—Radio control panel and motor generator set used in the operation of the directional radio beacons at Hurdley Field.



Fig. 3—Radio range beacon marking of the route from Cleveland, O., to Seattle, W. D.

required for safety and transmit it to the pilot in flight. A simple receiver aboard the airplane will enable the pilot to take advantage of the radio service established by the Department of Commerce. The radio stations of the Department of Commerce will maintain a constant watch on 333 k.c. and 4206 k.c. for emergency and distress messages from airplanes equipped with transmitters, and will handle any communications required for the safety of flight.

Where air navigation facilities have not been installed by the Department of Commerce or present installations do not suffice, it is necessary to supplement the service by privately established and maintained facilities. Air transport operators have a peculiar responsibility as carriers of passengers and mail, and the liability for the safety of life and property cannot be transferred to any other agency. The air transport operators have therefore requested the reservation of frequencies for their use through the operation of privately established radio stations. A total of 89 frequency channels have been set up by the Federal Radio Commission, of which 64 channels in the 1920-6000 k.c. frequency band have been requested in conjunction with flying the airways throughout the United States. At the hearing of March 11, 1929, before the Federal Radio Commission, the air transport companies requested the allocation of frequencies on the basis of the assignment of exclusive channels to individual routes. It is to be used by any and all air transport operators on the basis of equal rights now and in the future, and to provide for the creation of radio stations for handling this traffic on a co-operative basis in which all participating operators will share equal service, costs and liability. Separate frequencies for night and day use were requested and a conventional radio and distress frequency of 4,035 k.c., on which the radio stations will maintain a watch, was tentatively assigned.

This plan permits the standardization of transmitters

Fig. 5—Apparatus including the antenna leading system and the components of the directional radio beacons at Hurdley Field.

signals. At Hurdley Field, the loop antennas have been placed 90 deg with respect to each other and three of the interlocking courses have been adjusted to mark the airway leading to Hurdley, Bellefonte and Washington. At Bellefonte, the pattern of the signal has been altered by the use of a vertical antenna in conjunction with the

existing voice in the band between 315-330 k.c. with a reliable range of 125 mi. Twelve additional broadcasting stations along the Transcontinental route have been completed to render the same type of service and will be placed in operation early this spring.

On the Cleveland-New York route, a pricing teletype or teletype system has been installed under contract with the American Telephone and Telegraph Company for collecting and disseminating weather information between landing fields and main stations. This service is being extended from Cleveland to Chicago for operation in connection with the new broadcast stations erected at Bryan, D., and Maywood, Ill. Additional stations are now being built at St. Louis, Kansas City, Wichita, La Crosse, Los Angeles, Fresno, Oakland, Boston, Richmond, Greensboro, Spartanburg, Atlanta, Portland, Montreal and Seattle, and this system of disseminating weather information to the pilots in flight will be extended to other routes.

Before taking off, the pilot may obtain complete weather data covering the airway to be flown, and the departure, will receive hourly reports on the landing and weather conditions along the route. If landing at the terminal field becomes impossible owing to poor visibility, the hourly reports on landing conditions at intermediate fields and alternate terminal fields permit the pilot to

and receivers by aircraft manufacturers. The transmitters built for airplanes operating on any one route may be constructed around the frequencies assigned to that route and will simplify communications to and from ground. The allocation of frequencies to individual routes can be made so as to prevent interference with other routes and the communications problem of assignment of frequencies and operation along the routes is thereby simplified.

As communications to airplanes under conditions of poor visibility must necessarily be made by radio, it will be necessary to provide for communicating landing directions at airports by means of the radioteletype. One frequency for that purpose will be made available from the channels set up by the Federal Radio Commission. The radio transmitters at airports must have limited power and range not in excess of five miles so as to prevent interference between neighboring airports. Under this plan of having all airport transmitters on the same frequency, the pilot will listen in for landing directions upon approaching an airport and will follow

approach, and facilities that must be installed by airports in the future and requires the reservation of radio frequencies. Several of the 64 channels set up by the Federal Radio Commission will be reserved for that purpose. In order to accomplish the landing of aircraft by instruments, an accurate distance similar to the radio-echo altimeter or capacity altimeter is required and frequencies for that purpose must also be reserved later.

Several such radio altimeters are being developed or have been developed by Army, Navy and commercial engineers. It is not unlikely that they will soon be of-



A photograph showing the installation of apparatus for radio communications at the new commercial airport at the University of Wisconsin.

lined on the coast, and recommended as standard installations for all types of planes, especially transport planes.

There can be no doubt that air transportation from now on will depend in a large measure upon radio for its safety and flying efficiency. The radio air navigation facilities have been planned in order that all classes of planes, including the lone air mail pilot and the pleasure seeker, may make use of the service by installing a single receiving set on the airplane. The time has now arrived when all airplanes should be bodied during construction. The shielding of engines should be undertaken by the engine builders in order that the manufacturer may guarantee performance of the engine with the shielding installed.

Experiments are now being conducted with NACA type of covering to serve as the shielding for the engine in order that the shielding may be devised, thereby increasing the reliability of engines. No airplane carrying passengers should be flown over civil airways without a radio receiver installed to take advantage of the radio aids now being made available. Regardless making the installation of radio receivers and transmitters compulsory are being considered and will be issued just as soon as sufficient facilities have been installed to warrant these requirements.

Reaching the FOREIGN MARKETS Through Advertising

By WESLEY FOWLER

WITH the large increase in United States exports of aeronautic products which occurred in 1928, when 120 airplanes were shipped to foreign countries as compared to 53 in 1927, there may be an unwarranted complacency on the part of the industry in respect to export business. It has come easily in most instances as the result of the failure of publicity attending the record flights of the last few years, but the foreign business of our aeronautic industry remains small, and, one might say, inefficient compared to that of other industries. Approximately 17 per cent of the automobile production of this country is exported. Of the 4,300 or so airplanes produced in 1928, but 3.5 per cent went overseas and to bordering countries. In 1927, the ratio of airplane exports to production was but slightly less to show it really nothing to be proud of in the recent export increase as it indicates nothing more than a normal trend. In other words, the production increased between two and three-fold, so without strenuous effort on the part of manufacturers, exports increased in a similar ratio.

How can this situation be corrected? How can the aeronautic industry obtain its share of the international trade in airplanes? By analyzing the exports of one of our most important competitors we may arrive at a partial solution to the problem. France, with an airplane production smaller than ours, exported \$8,000,000 worth of aeronautic products in 1927 compared with our total shipments of aircraft, aircraft engines and parts during the same year at a valuation of \$2,933,560. Among other things—including the granting of credit and the maintenance of national aeronautic museums in some of our best markets—the French manufacturers advertise.

It is the contention of opinion, that it would be unwise for our industry to sell its distributors in foreign countries on a credit basis any more than plane factories should deliver "on tick" to our domestic distributors. The automobile industry has been distributing in so far as the manufacturer is concerned, on a strictly cash basis since its inception and this policy has been followed in its export business.

By advertising and by ordinary sales promotion (the effective distribution of appropriate sales literature) the aeronautic industry can offset the inroads made by manufacturers of other nations in the world markets. It is advisable, of course, for the manufacturers who can afford it to demonstrate their planes abroad. But both before and after the demonstration, advertising and sales promotion will rapidly

divulge the manufacturer with the thought behind them. What needs are there for advertising airplanes which render the unaided commentaries of the world, is a natural question. What should be asked in addition is, what merits are there which will promote sales and increase the number of potential purchasers of aircraft? The answers to these two questions in the order stated are:

1. The foreign aeronautic trade publications and the direct correspondence of pilots, governmental aviation officials, and civilian flying club members.
2. The general press such as newspapers and magazines.
3. The American publications having foreign circulation which may be divided into two categories: (a) those catering to foreigners only, which publications may spend on automobiles or automobiles, but will reach potential dealers, importers and distributors of aircraft; and (b) the regular aeronautic trade press of the United States, whose publications of which few considerable foreign circulation.



The Aircraft Division standard radio communication station, including the type of operation shown in Fig. 2.

the orders as to landing procedure received from the airport manager. The frequency tentatively established for airport transmitters is in the 400-500 k.c. band.

A problem of the future that has received serious consideration is the development of instruments for bringing an airplane to a safe landing under conditions of poor visibility. This must necessarily be accomplished by radio in one form or another. The ground facilities required for this purpose such as leader cables, carrier beacons, or other radio devices for outlining the landing field and taking the airplane over the track of a clear



An aerial picture of a Hall-Scott Stearman. This plane is powered with a Wright "Whisper" engine.

A description of each of these types of media follows. In reporting the results of a survey of European aviation publications, the Paris office of the Department of Commerce mentioned the following:

"A survey made with the assistance of the United States Commercial Attaches in Europe and officers of international associations has disclosed that there are about 54 aviation newspapers and magazines in every the public demand for aviation news in Europe, where commercial aviation companies are numerous and every

of the former contained no advertisement for American airplanes. In these two full-page entries by the agency in Rio de Janeiro for a General's airplane and one each for a British plane and engine. These were miscellaneous smaller advertisements, but none with exception of another lubricant ad for American products.

In Chile, Cuba and Peru there are automobile journals of larger circulation than the strictly aviation periodicals previously mentioned. The average for the strictly aviation journals, except for the Argentine "Aviation," which claims \$5000, is 2,000 claimed circulation.

In the Antipodes, there is the well known "Aerobit" which has a circulation of about 4,500 in Australia and New Zealand and 1,200 overseas principally in the United Kingdom and the United States. This bi-monthly publication with its reasonable advertising rates of \$10 per page and \$15 per half page with a 10 per cent reduction for insertions in each issue for a year, would be a good medium, in the event that American aircraft are allowed to enter and be licensed in Australia and New Zealand.

It would hardly be worth while to advertise extensively in Europe because of the limited market there. South America's demand is just now developing. It would appear that the only method of determining the value of advertising carried in the aforementioned publications for that territory would be by trial. The rates are quite high, varying from about \$30 a page in the case of "Aerobit" (Brazil) to approximately \$100



A right quarter view of the Wright A-10, which is being at 600 hp.

in the case of "Aviation" (Argentina) which has a larger claimed circulation.

As for the direct stimulation of prospects in foreign countries by means of brochures, basic organs and other literature, a questionnaire is now on its way to Department of Commerce officials asking for the names of pilots and flying club members. These lists for practically all important centers will be available shortly as a list of governmental aeronautic officials is now available upon request to the Aeronautics and Communications Section of the Bureau of Foreign and Domestic Commerce at Washington, or to the Bureau's district and co-operative offices located throughout the country.

In connection with brochures and other forms of descriptive literature for foreign consumption, it may be said that the appeal of aviation is universal and the more

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qualities of an airplane as another aeronautical product that would appeal to an American would appeal abroad. A lamentable lack of literature on American aircraft in Spanish has been reported from Spanish speaking countries. In this regard, the advisability of possession of being translations made properly so that they will not be misleading. There are capable translators employed by foreign advertising agencies and by some of the publications catering to foreign readers, which will be discussed later.

As for the general press, not only advertising but publicity may be quite effective. American agencies engaged in foreign advertising can recommend newspapers and other periodicals suitable for the advertising of aircraft and related products. There are such periodicals in South America and in the Far East which publish a number of aviation issues, few of which, it is noted, are about United States aircraft and aeronautic activities. It should be realized that publicity prepared by newspapermen should not assume too greatly of being "hard copy." It should contain facts, and there are plenty of them which would be of interest from an informative viewpoint. The advertising agencies have rates and samples of these periodicals and can advise as to the most important reader influence which after all is the most important



A front quarter view of a Wright A-10 aircraft, which is being at 600 hp.

factor to be considered. A publication which would be read by the sons of wealthy Brazilian coffee growers, or confirmation of the Argentine would serve as a logical medium through which to get a message over to the true wing and useful qualities as well as the growing safety of air travel.

There are several well-known publications catering



The new Wright A-10, four-cylinder folding wing model airplane. It is powered with a 25 hp motor.

exclusively to foreign dealers and distributors of lines somewhat akin to the airplane, in respect to the methods by which the foreign readers transmit business and the person to whom they sell. These publications will not be mentioned by name. They are sometimes in two issues, one in English and the other in Spanish. Their translations can be relied upon to present facts accurately in language that can be understood by the buyers or the technicians. Other magazines of this type cater to general merchants and jobbers and have departments for special lines of equipment. Practically all of them have accomplished some good work for the aeronautics industry.

And as they have devoted space to aviation without advertising surrounding it, it would appear that they deserve some consideration while foreign advertising leaders are preoccupied on according to the various effective media. There is no doubt but that this type of advertising is of value in reaching friendly able business houses which may logically expand their automobile, tractor and general merchandise businesses to the handling of airplanes.

The next class of medium is one in which the aeronautic industry is now advertising extensively, namely the United States aviation press including that which serves to the trade exclusively that having popular appeal and that having both. There are about 24 such publications in the country. Not more than five or six have any appreciable foreign circulation. Reports from abroad indicate that they are read with great interest and are handled around from aviation exhibitors to aviation enthusiasts and their sons and sisters. As example of the practical results of this foreign distribution is cited in the case of a copy of an American aviation journal which found its way to the office of one of the American Commercial Attaches in Europe. Forwarded on the cover were several American planes during contact with aerobitists in Peru.

A large enterprise in the European country was interested in invisible things and as the result of the photograph was placed in touch with the American manufacturer of the planes depicted on the cover of the aeronautic magazine.

The subject of foreign advertising to promote aircraft also deserves the consideration of all manufacturers who desire the valuable margin of foreign business which will enable them to keep their factories running during seasonal lulls in domestic sales. Certainly, a foreign advertising budget could be worked out on the basis of the ratio of domestic advertising expenditures to domestic sales, of which export sales for 1929 should be at least 10 per cent.



Rear quarter view of a Wright A-10 aircraft, which is being at 600 hp.

country has a military air service. Such publications exist in 13 countries, and are printed in nine different languages.

"Reflecting the newness and energy of the industry itself, the aviation publications of Europe are interesting examples of the trade press—generally all of them carry illustrations. Many have a pronounced popular appeal, with non-technical articles on general aviation subjects. In most of them, advertising matter is not particularly heavy, and among the advertisers appear to be numerous automobile and oil companies.

"A notable feature of these periodicals is the international scope of their articles. Even in publications of the smaller countries, frequent reference is made to the important developments of aviation throughout Europe, as well as in Australia and elsewhere. Many of the publications are official organs of aeronautical clubs and similar organizations, which might be considered somewhat of a guarantee as to their permanency."

A circular designated as No. 659 AD listing the European publications with their circulation and reader influence may be obtained upon application to the Specialist Division of the Bureau of Foreign and Domestic Commerce, Washington, D. C.

Other parts of the world, exclusive of the United States, largely because of the absence of manufacturers, are not so well taken care of with respect to aeronautic publications.

The monthly "Aviation" of Buenos Aires is well known. A glance through a recent issue divulges one full page advertising American aircraft and a half page advertising an American lubricant, with three and four full pages respectively advertising French and British manufacturers. Germany which produced 300 airplanes in 1928 (as compared with our 4,500) was represented by one full page spread.

In Brazil there is the bi-monthly "Aeromarcas" and the "Aviacao" published in Portuguese. A recent issue

WHAT THE *Exhibitor* HAS TO SAY

Various Comments on Things Aeronautical as Expressed by the

Exhibitors at the Second Annual All-American Aircraft Show

Boeing Airplane Company, Hamilton Memphis Division

IT HAS BEEN FELT THAT THERE WAS A large potential market for a cubic mono type airplane constructed entirely of metal, which would be non-corrosive, reinforced against weather conditions and afford maximum safety to passengers and pilots, and with this thought the all-metal constructed Hamiltonian plane is a result, and it has now been built and is operation long enough to make the designers and company feel well paid for their labor as its development.

We now have planes operating in Alaska which have been flying up as far as Siberia, some in South America, and have recently made another shipment there, and have several fleets operating through the central part of the United States, and is gathering information from both extremes, our planes have proven to be economical to operate and extremely satisfactory to the owners.

The potential possibilities for sales of a plane of this type are varied. They have been sold for pleasure as well as commercial purposes. They are used only as various, or small routes carrying both passengers and mail, and operate under most hazardous conditions in all sections of the country. It appears that the greatest problem has been and still is the particular type and size of plane that would cover the largest scope of requirements. No doubt now will establish the most desirable type and use of airplane that will lead itself for large volume production.

C. F. Bandy
General Manager

Mohawk Aircraft Corp.

IN AMERICA to the Mohawk "Pinto," we are exhibiting at the Detroit aircraft show a new model three-place cabin plane with a Warner "Scorch" 110 hp engine. This plane is built along the same general lines as those of the Pinto and we believe that it will be equally as popular. The new plane is really of a convertible type. It may be used as both a land plane and a seaplane, and as a cabin or open type. A land plane is an installation on our beach, while a seaplane is being used for demonstration purposes. The overall dimensions of the new plane are, length 22 ft., height 6 ft. 3 in., span 34 ft. 11 in. Its weight empty is 1,000 lb. The useful load is 700 lb. The pay load is 370 lb. and the gross load 1,700 lb. The plane is finished in cream and in olive drab.

Test flights have indicated that the high speed of the plane with full throttle at sea level is 160 mph, the cruising speed 119 mph, the cruising range 600 mi., and the landing speed 32 mph. The wing is of the full cantilever type naturally laminated and tapered. All fittings are of chrome-nickel-plated steel, or heat-treated chrome-nickel steel. The fuselage is constructed of chrome-nickel-plated metal sheet tubing. Dual controls are standard equipment.

John S. Sweeney
Sales Manager

Great Lakes Aircraft Corporation

ONE OF THE GREATEST PROBLEMS confronting the aircraft industry today is the need for a small training plane designed to incorporate every possible feature developed for safety and stability, without undue sacrifice in performance and to sell at a satisfactory price.

The present year will see flying schools established in many corners of the Union, operating under the guidance and having the approval of the Department of Commerce. These schools will be turning out flying pilots in vast numbers and equipment should be available for every one of these men to continue his solo flying until he has had enough hours in the air to qualify as a pilot. If a student then is forced to stop flying upon completion of his first solo his training is soon forgotten to a great measure and more instruction will be necessary when he is ready to fly again.

With this problem in mind, the engineers of Great Lakes Aircraft Corporation designed the airplane that we are showing and demonstrating this week at the All-American Aircraft Show. Experience has shown that the single engine, open cockpit biplane has more training conditions as they exist today. The biplane has shown itself to be safer in the event of a crash and possesses the trait of controllability best suited for the purpose. Inter-communication between student and instructor is of great importance, and yet it has been found desirable to have the student alone in his particular cockpit.

The Great Lakes training plane is powered with American Green Mark III engine. The Green engine, holder of many international records, is perfectly suited for atmospheric conditions, giving increased performance and perfect visibility, and is simple enough in design to be serviced by an ordinary automobile mechanic. The fuselage of the plane is of the retractable wheel type

and is readily accessible for inspection purposes. The wings and tail group structures are of the latest type of metal construction, with the exception of the wing bracing which are selected spruce. The trailing edges of the wings are made from sheet duralumin giving a very smooth surface. The Pinto type ailerons give the plane exceptional lateral control and the stability and safety is further increased by the use of wing slots.

The combination of a low landing speed and a high top speed makes this plane very desirable also for the "sportsman" pilot, and performance figures show that it is well qualified for this type of flying. While the plane has been built to sell at a price under \$5,000, there has been no attempt to sacrifice quality or to use a production schedule which at once is the only justification for this price.

C. F. Sweeney
First President and Director of Sales

Buhl Stamping Co.

SEVERAL MEMBERS ARE one company created at Aircraft Division which is devoted exclusively to the manufacturing of robust manifolds and nose cones for aircraft engine manufacturers, air sensors, gas and oil tanks and miscellaneous metal stampings, all of which are now exhibiting at this show.

We have been very fortunate in securing some very fine contracts from several of the larger aircraft engine manufacturers throughout the country for the above commodities and so propose to develop this division of our business in accordance with the demand of the trade.

O. J. Smith
Secretary and General Manager

New Standard Aircraft Corp.

SINCE THE NEW STANDARD AIRPLANE was first exhibited to the public at the Chicago show last December, developments have been highly gratifying from every standpoint. It has been necessary for us to triple our manufacturing facilities and to increase the production schedule again and again to keep up with the orders that have been received.

The latest creation of Charles Healy Day has simply

gained his reputation as a designer of airplanes and the biplane is now by men who have done his planes since the early days of the industry. A record of 22 successful shows, among them the famous J-7 Standard, is the solid indication of experience on which the present New Standard is constructed.

The success of this plane enables us to look forward with the utmost confidence to the future. We plan to produce a complete line of airplanes. A small two-place ship designed solely for training and expected to be one of the best for that purpose of those on the market is now nearing completion and will be ready to take the air in a few days. We also expect to announce during the summer an all metal dual engine seaplane which is expected to have an outstanding performance.

The future looks bright—very bright, not only for the New Standard Aircraft Corp., but for every airplane builder whose ships are strongly built and able to perform their allotted tasks efficiently and safely. In the aircraft industry, as in all others, it is the history of mechanical development, quality counts.

C. R. Quigg
President

Wright Aeronautical Corporation

IT IS OF COURSE RATHER NAIVE to observe that the aviation industry in America is in a period of sharp transition. Everybody connected with the industry knows that already. But there are certain aspects of this transition which though of the deepest importance, are frequently overlooked in our thoughts by urgent problems of manufacture and economy. One of these aspects—more involved in a profound and wide change—is the relation that exists between aviation and the public.

The time is rapidly passing when mechanical flight through the air stood to the public eye as the marvel of the age. As that time recedes, aviation engineers were and even are responsible as an enterprise engaged in public service a task to the level of consumer and industry. And the immediate hope of aviation lies in direct proportion to the forethought and care with which we meet this destiny. Aviation will begin its great expansion and its great usefulness when safety and romance have disappeared from flight, and when it becomes simply a commonplace means of transportation.

This state of affairs will not come about very readily of its own accord. It must be produced by the men

who manufacture and sell airplanes, and above all, by the man who operates them. The public is eager to have flight as simple and convenient a matter as entering. Efficiency is a greatly overused word and most of us are a little bored with it, until we are about ready to accept the Simple Lord's conclusion that "efficiency means doing a very simple thing with the utmost difficulty." Yet, after all, efficient labor is a nearly straightforward labor with confusion and lost action diminished, and everything reduced to its ultimate simplicity. It is with this sort of efficiency that the aviation industry must meet the public—and it is of the most vital significance on the flying fields, in the airports and in the service stations where the public really makes its contact with the business of flying.

In short, the manufacturers of airplanes and of engines have done about as well as they can do under the present circumstances. They are working to improve their products, of course. But even in the present day, airplanes and engines the physical elements in the new transportation are reasonably reliable.

The guest, then, is rather squarely up to this section of the industry which is in direct association with the public—which is introducing flight to the public, or leading citizens through the air. It is up to the men who operate flying fields, and air routes or who, in any other way, stand in the connecting link between the machine and the people who are to fly in it.

To the extent that these gentlemen direct their operations and their public contacts with safety and efficiency, poise and convenience—in that exacted will the public take deep confidence in the new vehicle, come it regard it as a commonplace, and make universal use of its manifold advantages.

There are many operators who have succeeded admirably in eliminating fear and boiler-plate and confusion from the movement of their ships. Many of them have, in fact, made the relation between their planes and their passengers as simple as the relation between a railroad train and its passengers.

B. B. Heighton
Director of Sales and Service

Nichols-Bosley Airplane Company, Inc.

THE TENDENCY OF COMMERCIAL AIRCRAFT MANUFACTURERS since the ending of the world war has been to grow greater and greater horsepower with subsequent greater top speeds and greater climbing ability. In order to secure the desired speed and greater climb the manufacturers were forced to sacrifice efficiency in pay load and operating expense.

It is, however, I believe that this excessive horsepower trend is changing and that planes will be built with lower powered engines with a greater pay load efficiency and more economical operating expense. As the sale of commercial airplanes increases and becomes more competitive, it is a common sense assumption that the air plane must become more efficient from a pay load standpoint and also from the operating cost standpoint.

The average "Whiffen" job being manufactured

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in this country today accommodates only about four people. This figure approximately 35 lbs. per person. It is the writer's belief that within the next 12 months we will find this horsepower reduced to approximately 25 or 30 lbs. per person. In order to accomplish this greater efficiency and lower horsepower per passenger, there will necessarily be a loss to a certain extent in top speed and climbing ability of the plane. However, this will again be increased by more efficient plane designs.

Commercial manufacturers in the past few years have been influenced to a very great extent by Army and Navy standards. This is not before me continues from a commercial standpoint.

Franklin
Pioneer Instrument Co.

AN EXPOSITION OF AIRPLANES, engines, instruments and accessories, and a definite picture to the industry as a whole. Such displays cannot be counted as new shows at which all manufacturers have assembled their products to give an interested public a view of the progress of aviation, nor can the exhibitions be entered in the nature of meets where buyers and sellers meet to transact business.

In my opinion the most serious show is one where the exhibitors—and the purchasers are given first consideration. Talk of them has been made in effort to be present where the Show is being held and many of them have gone to unusual expense to display their products before the greatest concentration of people will afford opportunities sufficient to justify the expenditures.

From the point of view of the exhibitor along the Show should be sufficiently interesting and vital to attract a great mass of buyers who have definite purposes and reasons for attending the exposition. Such men are potential purchasers, interested in new developments, concerned about the progress made by those who supply them with planes, engines, instruments and accessories and keenly conscious of all that is presented for their approval.

The larger fairs upon the Show as a great concentration of products which he can inspect at leisure and without traveling from one end of the country to another. He can compare quickly, he can see for himself that a plane manufacturer has changed his design slightly or that a new instrument has been added or that improvements have been made in the machine he was using.

Thus, to the buyer and the seller, the aviation show has served a very definite purpose. It has saved money for both and it has given each a better understanding of the supply and demand of such equipment as might interest any particular person or firm.

We do not mean to declare in any manner that public interest in a Show is not of value. There are millions of persons in this country, totally uninterested in aviation and deeply concerned over its progress. They are the people who attend every show who are highly critical and very willing to acknowledge approval of recent developments. A still larger class is constituted of the romance of aviation and the appeal of a battle. They flock to shows and spend many hours looking over each ma-

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hibit, never intending to purchase and often having no intention of contributing in any tangible form to the industry. Such people however are carriers of the contagious spirit of aviation and they advocate their beliefs with vehemence worthy of a wild cheer. They are the type called "air-minded."

A show, however, that appeals to them is filled with dramatic touches, such as acrobatic flying over the adjacent fields, quick military maneuvers by Army or Navy fleets and all instances of novelty. To strike responsive chords in their swelling hearts and delight those who exhibit and his buyer is not particularly encouraging to the members of the industry who make the show possible and who contribute their finest products to provide a cross-section of aviation as it is today.

Charles H. Bohm
President

Titaine, Inc.

WE SHOULD BE GLAD TO ADVISE that after three years since commencing over a period of more than 18 months, Titaine, Inc. now has ready for sale two new lines.

One is a first class flexible inquirer. True from practically all existing troubles. The other is an entirely new working material called "Tite-Tex" which finishes with a medium high gloss like artificial leather, but which contains none of the ingredients now commonly used in lacquers. It contains no auto oil, no gums of any sort or kind, none of the recognized plasticizers, and is practically non-soluble.

Titaine, Inc. has recently registered for operation in the State of Illinois and the State of Kansas, and has assigned for distribution of its products from various states under the name of resident salesman at Wichita and Chicago.

To take care of the production of new materials we have just completed a new lacquer unit which will replace the whole of the old factory for clear and pigmented dopes and allow an increase in production of around 60 per cent. Steps are now under way for the expansion of Titaine, Inc., to cover this enlarging of our activities.

Charles H. Bohm
President

B. Russell Shaw Co., Inc.

THE CURRENT PRACTICE confronting aviation development appears not so much in the ability of the public upon the safety of flying, but upon the ability of the contractors and operators to bring the cost of flying, and particularly the cost of air transportation to the point where it may be used extensively by the average layman.

Some of the operating companies have asserted that air transportation is a means of travel that will be paid for cheerfully at high rates, not only by the business class, but by the masses of population but because of the pleasure derived from flying.

In the first instance, air airport locations away into the speed which may be obtained in moving between points, because it is not the time it requires between points that interests the traveling public, but the time it requires to reach the city proper and that in turn involves overhead transportation from the airport to the city.

The second statement, that the public will pay the price because of the pleasure derived in flying, for the most part is erroneous. At least it appears such to the average traveler, and after all it is said and done, that is the passion that must be reached if commercial air transportation is to succeed. In some localities, of course, there are sufficient business men and pleasure seekers of enough wealth that they will pay high rates for high class transportation. This is evidenced by the carriage shown by some of our coach trips in the United States.

Air transportation cannot prosper unless air terminal facilities are available, so located and so constructed that the airline operator may secure his patron of scheduled runs, properly maintained equipment and cost of transportation from the airport to the city.

Unfortunately, there are but few airports in the United States. There are many flying fields and if we can prevent the building of airports and air terminals from being made public facilities and can have these airports and air terminals constructed to meet the needs of every-day commercial air transportation of the largest and heaviest equipment, then we will have accomplished one of the most important steps necessary in the development of air transportation in general.

B. Russell Shaw
President

Stinson Aircraft Corporation

THE STINSON AIRCRAFT CORPORATION is exhibiting their planes at the All-American Aviation Show. This is the first public presentation of the new and refined 1939 series, incorporating many new features.

Chief interest, reveals around the announcements of the new eight place Stinson-Detroiter, which is powered with the 425 hp Pratt & Whitney "Wasp" engine. This plane is a larger version of the famous six passenger Stinson-Detroiter, which was first produced with the new J-6 300 hp Wright engine. Both of the large Stinson models have unusually wide cabins finished in the West End grade mahogany upholstery, and the chairs are individually finished with the same material. The cushions are fitted with springs in place of the usual padded cushion. A large baggage compartment is located at the rear of the cabin, and a locker with full battery facilities is furnished as standard equipment.

The latest model of the new Stinson Junior, the first model of which was exhibited at the 1938 Detroit Show, is also on exhibit. The cabin of the Junior has been greatly enlarged and the entire plane improved. An additional baggage compartment is placed at the rear of the cabin between the edge of the rear seat and the cabin wall.

The Junior has been designed to carry a heavier load than the 1938 model. It also may be powered with a choice of four engines. The 110 hp Continental, 95 hp Wright, 170 hp Curtiss "Challenger" and the new new

made, and eventually are being made, toward placing the aviation industry on a sound production economic and financial basis.

This present-day need toward the merging of allied interests in the industry I believe to be the most significant and progressive move that has taken place since the first flight of the Wright brothers at Kitty Hawk, N. C. That this merger movement will stimulate the entire industry, few with vision can doubt. It promises, for one thing, the entry of the industry into a production boom for the first time in its history. Endusers of this are already apparent, particularly in the airplane instrument field, where there has taken place recently the merger of three important research and manufacturing enterprises with that of its own company, backed by important financial interests.

And it may be asked, what will the entry of the industry into a production boom mean?

It is bound to improve manufacturing and design methods, resulting eventually in lowered costs of the finished product, as well as a better product. We'll produce something, we are bound to follow, further in the steps of the automotive industry in establishing assembly-line facilities. Concomitant to this the industry will establish standardization of manufacturing methods and standardization of parts. As an outcome of this, we have again in the instrument field instrument boards that are interchangeable with one another, and individual instruments of standard design and size made to fit any position on the board.

Thus it may be said, with production and standardization methods in well under way at the beginning of 1959, the aviation industry will produce that has created the industry is well on the way toward complete solution.



Davis Aircraft Corp.

DAVIS AIRCRAFT CORP. is looking forward with confidence to development in the light airplane field within the next few years fully equal to the remarkable strides made within the past two years in large passenger and cargo carrying airplanes. It is a development that is in fact already under way and rapidly gaining momentum.

We are not overlooking the development of the "fifteen airplane," which the newspapers regularly predict will soon be commercially evolved and produced by the tens of thousands, but the development of the thoroughly sturdy, staunch and reliable light airplane of moderate initial cost and low operating and maintenance expense.

Flying schools are slowly feeling the need for such a plane. It will reduce their training costs, permit a reduction in fees and probably bring in a increased number of students. Another, and growing source of demand for such a plane is among those who have received their elementary flight training, and desire a dependable, but moderate priced plane for their personal use, or to increase their number of flying hours to the point necessary to obtain higher grades of licenses. The airplane production capacity of present and future facilities are far beyond the capacities of the present supply of pilots to fly them.

Intensive flight training, specifically directed toward the production of a plane of moderate price, able to stand punishment and possessing inherent safety features, associated only with much larger and more expensive planes. The reception with which the plane is meeting with both schools and private owners, we believe is a confirmation of the possibilities which our survey of the situation led us to expect, as well as an indication of a more general active interest in aviation which will benefit the industry as a whole.

Reader, myself "Pat" Lane, superintendent; T. J. Fahrenstede, purchasing agent; Will W. Reiter, secretary; J. C. Gregory, salesman; Fred Finon Le Roy, test pilot; and Ben Marillac, field manager for the company, are in charge of our exhibit.



President

Alexander Aircraft Co.

LIKE THE SMALL AUTOMOBILE, light airplanes were within the grasp of enough consumers and suitable for so many useful purposes as to remain a steady and growing demand.

The demand for lightplanes has been so broad that we find it hard to say which type of customer makes the best market. Our three place biplane and four-passenger-and-a-dog "Bulfinch" have been found suitable for any class of service up to a payload of 750 lb. We do not intend to go beyond the 750 lb. payload limit in the new Bulfinch line at this time.

It is gratifying to see the growing number of private owners. We like to call our ships "family" planes. They fulfill that important need. Long rural parties are coming to airplanes because more miles along dusty roads or crowded highways. After a breezy, Sunday dinner, guests fly off by their families to visit friends in the next state and get back in time to read the refrigerator for an evening lunch.

Aircraft shows help bring about the happy state of affairs. They enable the general public to acquire a real feel with aircraft construction, aircraft, flight and flying knowledge. They are a magnificent glass through which the public gaze is concentrated on individual ships that sell. In many respects regular exhibits are more important to stimulate than to stimulate, for this reason.

Everybody, including the slowest moving person, is in a room in more or less close contact with automobiles every day. They are always on parade, especially when you try to cross a street. Airplanes are not so close to the public—sometimes more by space, seldom than usual. They must always be viewed at long distances by people who seldom visit our fields.

At air shows the public is free to swarm around the planes, learn of the different models, peek in the cockpits or cabins and note the steady construction and clean lines of modern aircraft.

As I have often said the great problem confronting aviation today is the development of a light ship with a reliable, completely standard plane. The airplane production capacities of present and future facilities are far beyond the capacities of the present supply of pilots to fly them.

It is easier to build a plane than to train a pilot. I am confident that this condition of imbalance will automatically be taken care of.

The big feature of our exhibit at the All-American Aircraft Show in Detroit this week is the new Bagdad-Bulfinch cabin monoplane, seating four people and a dog. In the design of this ship we have striven for three permanent features—safety, speed and comfort.

We have uncompromised safety in the Bulfinch by increasing the factor of safety in construction, and by designing for fast take-off, low landing speed, a wide range of visibility, and extreme positive controllability under all conditions and particularly at the stalling point.

Speed is achieved by providing everything possible from the air flow and engine away from the propeller. Even the landing gear disappears completely in flight. Good design has made the ship extremely light for its load capacity without acquiring the strength.

We have arranged for the traveling comfort of our customers. There is plenty of leg, head and elbow room for the four people in the cabin. And we have seen to it that the dog enjoys as much comfort as the four people. We are giving passengers a feeling of surprise. They are not packed closely together as they are in crowded quarters.

The broad head windows give the pilots and passengers a nice view of the country below. The long expanse of wing visible from the cabin windows is reassuring to a timid passenger. It is also comforting for the passengers to reflect upon the added safety of strength on the wing rather than having the wing bones overhead.

We have contracted for a large supply of commercial air cooled engines. The low gravity construction of engines required to fly the Bulfinch fully loaded makes it a good ship for the private owner and the small airline operator. It checks out to a safe altitude, and its maneuverability makes possible many short passenger hops in a given time. We are installing an extremely simplified and safe control system. There are no wires to trip and break.

Our display in Midway, White Knave, is exhibiting one of the first models at the big exposition this week. It is making personal charge and will carry a large supply of literature on hand to show the fine points of the plane to the crowd.



President

Berry Brothers, Inc.

AVIATION AT THE DETROIT SHOW is focusing on the airplane craftsmanship of Berry Brothers, manufacturers of the Bagdad-Bulfinch. This entirely new device which is designed to increase airplane sales and facilitate the selection of suitable color combinations is on display for the first time at the Berry Brothers' booth.

The colorizing consists of two colored transparencies, one carrying a half-tone illustration of a typical airplane, the other a matching color. These color cards slipped in a frame beneath the colored overlay and showing through white-outlined areas, give three-color combination effects. The airplane proprietor is able to choose the combination that best fits his need or suits his taste. Both the

monochrome and halftone have 15 different color effects. The transparencies and cards are mounted in a handsome container. Berry Brothers is preparing a sufficient number of colorplates to supply out to each airplane manufacturer who is using Progressive Aircraft Finishes.

Another interesting feature of the company's booth is a model mini plane in attractive colors suspended before a moving background. The choice of field is most striking. Twenty-four large four panels featured in Bagdad-Bulfinch color combinations complete the Berry Brothers' exhibit. The booth is attended by Tom Cully, manager of the aviation division, Tom Murphy, assistant manager, Louis Perry and Ben Coon, assistant clerks, Henry Williams, manager of the St. Louis branch, and the following aviation inspectors: Ben L. Smith, Elmer Rick, California; George Gordin, Buffalo and Cleveland; Arthur Clark, New York; George Schlegel, Wheeling, W. J. Symington, Minneapolis; Herbert Langston, Philadelphia; R. T. Sapper, St. Louis; J. L. Berry, Wichita, and Gordon Stratton, Tulsa.

Berry Brothers' headquarters are at the Detroit-LeMay Hotel. The company is holding open house at Chateau Vaugoussier, a new aviation and country club on Grosse Isle that has excellent landing facilities.



Manager Harry & Associates Department

Spartan Aircraft Co.

THE SIGNIFICANT PROBLEM facing the airplane industry today is the problem of mass distribution. The problem of quantity production is important, but that is not the key in building a line of airplanes if they cannot be sold.

In the past, the airplane manufacturer has been in a peculiar position. The cost of building airplanes has been so high that in order to keep his price down where the ship could be sold at all, the manufacturer has had to limit his construction to the small. Many companies have gone ahead and built a lot of airplanes and then placed the whole burden of their distribution on their dealers or distributors, allowing them a discount averaging about 16 per cent. The problem of quantity production has been worked out in a point where rapidly with good financial backing could then set up a factory and build a lot of planes. But after building them, the usual procedure has been to place the whole burden on a group of, at the whole, inexperienced dealers, allowing them a meager compensation for their work. If a dealer tries a plane, returns his ship properly and does even a minimum amount of advertising, it costs him from 15 to 15 per cent to operate.

In view of the fact that the airplane business is still new to most dealers, they must be allowed to go a bit slowly at first. The dealer should be given an even break and not maddled with too large a quota. In addition, the manufacturer must realize that the biggest responsibility for his distribution rests with him. By national advertising, co-operating with the dealer in the way of furnishing him with sales data, brochures, budgets etc. and by personal contact with the dealer at least every thirty days to help him with his problem.

Left: The new "Cyclone"
powered Stearman biplane

Below: A Whirlwind E. M. Laird
mail plane



Above: A "Wasp"
Bering mail plane



Above: A "Challenger"
engine Stearman biplane

Left: A Kinner powered
American Eagle



and to visit his hot prospects with him, the manufacturer can give the dealer a chance to get his foot on the pedal and help build for future sales as well as immediate sales. In short, as one well known manufacturer has it split sales it is not a question of "How many planes can we help him sell?"

The Spartan Aircraft Co. is offering a complete line of planes for 1929, namely, a light but rugged tandem biplane training plane equipped with a modern inverted engine, a 3-place open cockpit biplane, a 120 hp. Curtiss Challenger job with Olin gear. Heavier aircraft and fuselages, complete accessories and aerial properties, and a 4-place dual control cabin job with Wright Whirlwind engine.

However, the Spartan Company realizes that it must depend on a loyal and efficient group of dealers to market this new line for them. It realizes that these dealers are in business to make money and that if they cannot make money, neither can Spartan. Therefore, our new plan for dealers is an attractive and conservatively worded one based on the maximum business possible at this time, plus a very complete system of dealer cooperation.

The Spartan Aircraft Company has a modern dollar factory at Tulsa, Okla., an engineering department second to none, and a fine line of engine shops, with prices slightly below the market as a whole. Its co-operative dealer plan for 1929 will put it in the permanent forefront of the aviation industry.

L. R. Doolley

Chance Vought Corporation

THE EXHIBIT IN THE Vought Corporation in its Detroit Auto Show promises again to be a feature of the Show. This company is exhibiting one of the latest of its famous Vought "Corsair" series planes, equipped with the new Vought amphibian gear, and Humpy-Pump slatted wings. In addition patterns of Vought planes at work, and section pictures of the construction of Vought planes in the Long Island City Plant are also being shown.

The plane exhibited is the new type as the planes which were recently supplied the Mexican Government except that the Mexican planes were equipped with wheel instead of amphibian landing gear. These planes are being used by the Federals in action against the rebels and if the results claimed by the U. S. Marines in Nicaragua are an indication, the use of high performance planes of the Vought type will prove effective.

The Vought type amphibian gear, in connection with the Vought "Corsair" 2-place observation plane, has become the standard type used by the U. S. Naval Air Service, a large number of these planes having already been delivered, and were used at the annual exercises U. S. "Seawing" and "Landing" in the recent exercises. This amphibian gear is inherently simple, positive in action in any position, and comparatively light in weight, making it an all-around performance greatly in excess of that shown by former types used for the same purposes. Planes using this gear are quickly con-

verted back to straight landplanes, which, in emergencies, makes immediately available to our Air Service planes of the highest possible performance, and in the same time possible, planes incorporating the amphibian safety features of being able to land either in land or water.

The Vought exhibit is particularly interesting to the people of the middle west, because the Chance Vought Corporation is the largest manufacturer of airplanes for our Naval Air Service, and it gives the visitors at the Show an opportunity to see the quality of aircraft used by our Navy. The number of Voughts in the Navy service exceeds, by a wide margin, the number of any other type, and during the fiscal year 1928 over 2,000,000 sq. ins. flown by U. S. Naval personnel in planes of that make, over twice that flown in the next type. In addition to the Navy Vought planes are in service in the Air Corps, the Coast Guard and in the Argentine, Cuban, Paraguayan and Mexican Air Services.

The Vought company is one of the oldest airplane manufacturers in the country, having an enviable record as builders of successfully advanced types of airplanes. Chance Vought, the head of the Vought corporation, is one of the country's pioneer pilots, having learned to fly in 1911 in the old Wright machines, and has flown his entire life in the advancement of aviation.

This background and excellent record has resulted in the Chance Vought Corporation recently becoming a unit in the United Aircraft & Transport Corporation, the largest and one of the best located organizations in the rapidly expanding aircraft industry. The other units of United are the Boeing aircraft, the Pratt & Whitney Aircraft Company, builders of the famous "Wasp" and "Harvet" engines and the Hamilton standard.

Ed R. K...
Assistant to the President

Metall Aircraft Corp. of Cincinnati

IN THE AIRPORT PLANNING the Metall Aircraft Corp. of Cincinnati offers to the airport public a solution of its vexing problem of how to attract sufficient traffic to make intensity on lines profitable. The key to this problem of increasing the density of passenger traffic is better mass, more intensive service and safety and comfort for the passengers. We have seen a tremendous increase in intercepts but traffic from these of these conditions, namely, their ability to offer rates now possible with railroad rates, to give much more frequent service and trading activity, and to care in the comfort and convenience of their passengers.

All of the conditions that have helped to build up inter city bus traffic can be accomplished with the Allentown PLANNING. For instance the PLANNING offers a pilot and seven passengers with ample baggage at a flying cost per mile less than railroad fare. Even when these advantages are made for administrative overhead, selling expense, low capacity load and dividends for the stockholders, the cost per passenger mile will be comparable with railroad fares plus Pullman.

The moderate first cost of this durable Allentown aircraft plane makes it possible to buy without need for a line to permit of frequent trips between the cities.

The feature is of great importance in building up the volume of traffic, because insurance drives the passenger fares so many airlines that a restricted terminal does not meet the requirements of the diversified passenger line.

In analyzing the conditions that traffic managers are meeting in collecting passengers they stress the importance of lower passenger fares to increase the volume of traffic. In many cases they point out that the public is getting sufficiently educated on the safety of flying in modern planes but that the real obstacle is to pay the excess airfares. One fact that has been necessary in the past. With the lower fares made possible by the A3-metal PLANTING, this is eliminated. The public is becoming well educated on the characteristics of many of the present day planes and it is natural that the public selects the increased safety and decreased fare afforded by Aluminized planes, just as steel airplanes are preferred to wooden coaches.

This year will see many general managers confronted with demands from their stockholders or paying dividends on the present amounts which have been authorized for operating funds. Stockholders want dividends, not this, and in the long run will select as managers men who can best solve the problem of making dividends for the stockholders. To the management in particular the low operating costs, reasonable first cost and long life of Aluminized equipment strongly appeal. For instance, with an Aluminized PLANTING, the saving in depreciation alone approximately equals the full bill. The lower maintenance of Aluminized represents a saving about equal to the pay of a good pilot for two or three months. The consistent performance of the metalized and metal-plated PLANTING can be maintained for many years. That is one of the secret secrets of experts on the profit and loss statement. By decreasing this as well as increasing the volume of traffic by the low rates made possible with Aluminized PLANTING general managers and operating managers will be satisfied in showing dividends for their stockholders.

W. H. Hoffman
Director of Sales

The Goodyear Tire & Rubber Co.

WITH AIRCRAFT TO OUR EXCLUSIVE use the All-American Aircraft Show we are displaying a full and complete line of all types and sizes of aircraft tires and tubes together with aircraft rubber accessories such as shock absorber disks, aircraft greases and aircraft specification gasoline and radiator hose.

We, of course, are in a position and have an organization to maintain contact with the engineering and purchasing divisions of all aircraft factories with regard to the original equipment tires required for the manufacture and delivery of airplanes. This company has been producing airplane tires since 1908 or 1909 and has always been leader and in the forefront along aircraft matters. Naturally we have kept pace with all developments and our present tires have a full line of all types and sizes of aircraft rubber to offer to the industry.

Some time this age it was noted that the rapid expansion in the use of aircraft would soon call for some

method of distribution which would permit replacement tires and other rubber products to be available on the airport. We therefore immediately developed the Service Station dealer proposition, which is open to dealers of airplanes on airports for the handling of airplane tires and tubes. A large number of such dealers have already been established and, as a result, we believe that we have fairly well taken care of the critical need toward distribution of airplane tires and tubes.

We realize that this type of distribution is desirable on engines and parts of all types and believe that the airplane men and operators and also factories will appreciate establishment of such service on the rubber requirements which in many cases will not doubt be a leader and a source for the establishment of similar distribution on other parties.

L. O. Smith
In Charge, Sales
Tire and Rubber Department

The Dayton Manufacturing Co.

UNTIL RECENTLY very little attention has been paid to the interior trim of cabin airplanes, and passengers have been forced to ride in comparative discomfort in cabins anything but pleasing in appearance, however within the last year we have seen great improvements in this respect and most designers have recognized the necessity of providing comfortable and attractive interiors.

The first and most important place to turn for information on this point was to the automobile manufacturers, but it was soon found that for the most part automobile and bus experience was not satisfactory as it was not as well suited as railroad fittings. A completely new line had to be developed, and it was only within the last year that such material, especially designed for aircraft use, has been available to aircraft builders.

Automotive hardware, door locks, etc., are used with great success on the interior planes, but this type of equipment has proved entirely unsatisfactory for use on planes of the transport class. For this latter type of plane there are now several types of door locks available with aluminum cases and streamlined knobs.

Luggage compartments are no longer a problem as there is considerable material available at the present time, and new designs are being constantly brought forward. Aluminum washbasins are not recommended except for use on extremely small planes where even a pound or two extra weight is spent in the case of appearance and durability, and even if aluminum washbasins could be used they should be properly designed plates. Upholstered aluminum luggage equipment never presents a neat appearance, cannot be kept clean, and is very unsatisfactory due to its susceptibility to corrosion. To do the best form of washbasin is made of a light gauge aluminum or other white metal upon a frame of brass metal or plywood drilled for lightness. This type of stand will remain in high polish, is very easily cleaned and is extremely durable. Such washbasins may be obtained in a variety of forms, and may be equipped with aluminum faucets for hot and cold water. Due to the weight factor, the faucets should be made of aluminum, even when they are used for drinking water, and in any case should be of the self closing type in order to conserve the water supply. For the smaller planes there

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are two types of aluminum folding washbasins which fold up into an extremely small space when not in use, and weigh approximately three pounds complete.

The question of a water supply is quite solved on most planes by mounting a radiator tank directly above the washbasin. The tank is equipped with a self closing aluminum faucet which empties directly into the bowl and by substituting a bronze or brass faucet the same tank may be used for drinking water. Here again aluminum tanks should be used only where it is absolutely impossible to carry the slight added weight of stainless steel and never for drinking water. The problem is very neatly solved on some ships by the use of a washbasin in which the tank is an integral part of the stand, several types of which are now on the market. Remote gravity supply tanks are used on most of the larger planes, and in this case the faucets should be built into the washbasin.

Cherished dry notes especially designed for aircraft use solve the toilet problem very successfully. These closets consist of an outer shell of aluminum, and a removable inner bucket which contains the supply of chemical deodorant and disinfectant. A light wooden seat is mounted on top, and either a toilet bowl or pressed aluminum lid may be specified. The floor of the bigger size, on the smaller model is of a very form of skating floor, and weighs less than its peers complete.

For the extremely large ships there are available aluminum refrigerators and buffet equipment using dry ice as a cooling medium, and we have promise that a light aluminum electric stove will be on the market in the near future. The designer need no longer worry over electric lighting fixtures for his ship, as there are already several manufacturers making aluminum dome lights and attractive light weight bulb brackets.

With all of this material available at the present time and the many ingenious designs already designed, there should have no trouble in bringing out ships that will rival the most luxurious motor coaches in point of attractive interiors and provisions for the comfort of passengers.

H. E. Hoffman
Mechanical Engineer.

Keystone Aircraft Corp.

THE FIRST NATIONAL COMMERCIAL PLANE manufactured by the Keystone Aircraft Corporation Inc. under the "Patricia" and the Keystone-Loring Aerobibian "Air Yacht." Both of these planes are being displayed at Detroit during the All-American Aircraft Show.

The "Patricia" will be at the field as an extra trip from the Pacific Coast. A noteworthy new commercial plane in early February by the largest commercial transport built in this country is easily considered and it is expected that the plane will attract considerable attention. The plane has visited Washington, D. C., Dayton, Ohio, Cincinnati, Ohio, Indianapolis, Ind., St. Louis, Mo., Kansas City, Kansas, Wichita, Kan., Tulsa, Oklahoma, Oklahoma City, Okla., Dallas, Texas, New York, N. Y., St. Paul, Minn., Phoenix, Arizona, Los Angeles, and San Francisco, Calif.

The three Wright "Cyclone" engines have functioned perfectly during the tour, according to information received from Capt. St. Clair Street, pilot of the

Patricia," and Kenneth G. Proser, who is in charge of the tour.

The Keystone-Loring aerobibian "Air Yacht," the first of a series to be placed in service early this month by the Thompson Aerobibian Corporation, air mail contractors in the Great Lakes District, for passenger carrying between Detroit and Cleveland, is an exhibit of this corporation on the floor of the Exposition. The machine is a strictly steel model.

Representatives of the Keystone Aircraft Corporation attending the Exposition are Edgar N. Root, president; Albert P. Loring, vice-president; C. L. Bolson, vice-president; C. T. Porter, vice-president; Grover Loring, director; Stanley W. Jaggard, Sales Department; Jack Halpin, Sales Department; and Walter C. Loebe, Sales Department.

Stanley W. Jaggard
Sales Department

Norman-Hoffmann Bearings Corp.

ONE FEATURE at the All-American Aircraft Show in Detroit is featuring a number of special designs developed particularly for aircraft use. In addition to our regular line of ball, roller and thrust bearings we are showing our type XLS ball bearings and type XLS roller bearings, the latter being a new series consisting in dimensions with the former and brought out especially for the aircraft field where weight is such an important factor. The bones of these bearings are disproportionately large with respect to the outside diameter and the many applications they are ideally suited. These bearings will appeal to designers confronted by space limitations which preclude the use of standard bearings as well as to those seeking minimum weight per horsepower.

On display are a number of crankshafts with bearings mounted thereon to show the various characteristics of bearing design on typical radial engines. Some of these are from engines most recently put into production like Menasco Conquest and the new Continental and Selsby. The use of ball bearings on electrical equipment is also being demonstrated.

Another of our interesting exhibits is that of several types of superchargers which are of both the high speed overspeed type as well as the slower speed Roots blow-over superchargers. The high speed supercharger exemplifies modern day requirements for precision ball bearings which are required in turn at speeds up to 30,000 r.p.m., accompanied by considerable gas friction, necessitating a difficult problem from the standpoint of bearing design and lubrication.

Aircraft radio equipment is represented by radio generators, tone alternators and variable pitch propeller drives for radio generators. The well known Deslators constant ratings propeller systems are on display.

Aircraft instruments fitted with ball bearings there is being shown such as motor compasses, air distance recorders, tachometers and the like. In line with the new aviation interest shown of late in the application of ball bearings to control pulleys and other similar parts, there is a special display of control pulleys with

Right: The Davis "Redhead" monoplaner with LeBlond engine

Below: A "Wasp" powered Fairchild 71 monoplaner



Right: A three-engined Fokker F-10 transport



Left: A Veebe powered Mohawk "Pinto"

A "Wasp" engine
Hawthorn All-Metal monoplaner



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hull bearings which are fitted in such a way as to make them in effect an integral part thereof. The hull bearings used for this type of application are equipped with protective side plates for the exclusion of foreign matter and the retention of lubricant.

The following representatives are in attendance: Messrs. G. P. Williams, J. E. Ritter, E. Harwood, F. W. Meisinger, Major Henshaw, T. J. Hawley, C. H. Walker, T. M. Kato, R. H. Hecker and C. D. Wilson. Hotel headquarters are at the Detroit Leland.

O. P. Wilson
Joe Portland

American Eagle Aircraft Corp.

PRINCIPAL AMONG THE SALES DEPTENTS FOR COMMERCIAL and sport type aircraft today, in my opinion, are the manufacturer, the flying school operator, the aerial taxi service operator, the aerial photographer, crop or fire observer, aerial advertising, etc., private flying clubs, the sportsman business and individual concerns whose officials and representatives travel regularly and short haul air mail and passenger lines. The sales field also includes regular air mail, express and transport routes, but these are far busier, specializing in the heavier and the spacier types of machines, planes which have unusual pay load carrying characteristics.

The chief sales outlets this year will be to those persons, who whenever possible, that an airplane can be used more efficiently than any other form of transportation. Sales to business and industrial concerns will be in large numbers, and I believe this will be one of the fields most susceptible to expansion. Sales will be made in large numbers in flying school and aerial taxi operators and the old-time "harrowmen" will still be a factor.

I consider aircraft shows an invaluable aid to the industry. It is possible for the manufacturer with a complete line of airplanes to show, to advantage, the outstanding features of his planes to his dealer organization. It is possible for aircraft shows to give new distributors and dealers for the shows attract, first of all, persons no longer merely curious, but anxious to affiliate themselves with the industry. Aircraft shows, too, do a great deal of good in promotion of "aeromobility." The business comes with through the sales at an aircraft show without becoming thoroughly specialized with the idea that aviation no longer can be spoken of in terms of "flying," but that today it is a potent factor in transportation.

Selling aviation to the general public is highly important. In fact, I believe it is of prime importance for when the average man and woman come to look upon the airplane as a commodity, a type of transportation convenient (recreational), much of the missionary work so necessary to the industry will have been accomplished.

I consider development of the sales organization the major problem today confronting the aeronautical industry. Increasing the right type of distributors and dealers in entering the aviation field is a problem which requires very careful study. The need is not for super-salesmen. More, the need is for aggressiveness and a knowledge of the airplane and how it can be applied to the needs of the prospect. Today there are a great

prospects who can be sold airplanes if the right salesman makes the call. It is my opinion that men engaged in the automotive sales field are ideally fitted for the aircraft sales field. They have long been engaged in selling transportation, and that is exactly what the aircraft salesman is required to do.

The sales for sports use, for flying school and aerial taxi service and to the businessmen will be as a "volunteer crop" of gains compared with sales in the transportation market. In this latter field it will be necessary to sell transportation. First of all, and to create the demand class. This need not be so difficult, for the business man, an industrial firm head, will be quick to realize the importance of listening to a man whose message is framed in terms of dollars.

The outstanding features of the American Eagle Aircraft Corporation's exhibit in the Detroit All-American Aircraft Show include, first of all, airplanes which are "flexible," economical and exceedingly rugged. Then, too, American Eagle airplanes are built with the "eye value" angle always in mind. They are invariably in tune to and explicit with common sense.

E. E. Porterfield Jr.
President

St. Louis Aircraft Corp.

THE CARIBBEAN, a monoplaner of cabin type, recently built by the St. Louis Aircraft Corporation, a subsidiary of the St. Louis Car Company, St. Louis, Mo., makes its official bow to the public at the All-American Aircraft Show.

Anticipating the individual needs in air travel the St. Louis Car Co. practices in the manufacture of transportation equipment, recently reentered the aviation field and brought out the Caribbean.

The Caribbean is designed to comfortably accommodate two persons. The enclosed cabin has an automobile-type seat, well upholstered and comfortable for long travel. It is provided for handy entry and exit. Entrance to the cabin is through an inwardly sliding door. Windows of Caribbean, a non-collapseable, synthetic glass, provide wide and easy vision, special visibility being possible through a skylight in the top of the cabin.

Construction features of the Caribbean make it ideal for training purposes, as well as a means of transportation—there are two sets of rubber pedals, and through a special attachment on the stick the plane may be flown from the right side as readily as from the left which is normally designated for the pilot. The controls are direct cables, being read only for the rubber. The standard regulatory instruments, which are part of the regular equipment, are enclosed under a single glass panel, as is the gauges in modern automobile design.

The fuselage is of chrome molybdenum and 35-38 carbon steel, all in accordance with Department of Commerce requirements. The wing is of spruce, spruce balsa construction, covered as is the fuselage with the highest grade airplane linen. Two aluminum gasoline tanks, each having a capacity of twelve and one-half gallons are built in the wing, the tanks being conveniently located for refueling. The oil capacity is three gallons. Tail end assembly is of aircraft wheel design. Split type landing

gear is of spring pneumatic construction. Internal coupling bushes are also standard equipment.

Powered with a five cylinder air cooled 140-hp engine of 65 hp, the Cardinal has a top speed of 105 m.p.h., cruising speed 85 to 90 m.p.h. and landing speed 25 m.p.h. The Cardinal wing has a span of 33 ft. 4 in. and a chord of 60 in., representing an area of 162 sq. ft. It has an overall length of 20 ft. 7 in. and an overall height of 7 ft. 0 in. The weight empty is 825 lb. and the take-off load is 1,000 lb. The wing is wired for navigation lights and tailed for air speed indicator. The stabilizers, which may be adjusted in flight, has a range of three to two degrees positive to one degree negative. Flatted propellers are standard equipment. The color scheme is an attractive arrangement of cardinal red and silver.

EDWIN B. MEISSNER

Dayton Airplane Engine Co.

THE DAYTON BEAR, which this company is exhibiting at the show, is a four-cylinder vertical, air-cooled engine designed for use in light airplanes. One of the features is the use of an aluminum alloy head on a nickel-iron cast cylinder. The engine is strictly built with no internal dampers or internal silencers. It develops 110 hp at 1,800 r.p.m. or 120 hp at 1,800 r.p.m. The bore is 4.5 in., stroke 7 in., and displacement 552 cu. in. The engine with the double camshaft, propeller hubs, and necessary accessories weighs complete 275 lb.

The popularity of this engine is shown by the fact that the company has received orders for more than 900 of them this year. Fortunately, the plant of the manufacturing company is of sufficient size so the production may be increased. The company is headed by R. R. Grant, who has been connected with airplane engine development for the last 26 yr. He is known particularly for his work during the World War when he served as an aeronautical engineer with the production engineering department of the United States Air Service.

Whitely Manufacturing Co.

THE ACQUISITION OF THE AMERICAN RIGHTS for the construction of the Avro Avian in this country by the Whitely Manufacturing Co. offers to a distinct type of domestic purchasers an opportunity to buy a plane which incorporates these qualities sought after by the pilot sportsman.

Although we do anticipate a day when the market will be saturated of more than the worthy sportsman at the present time he is the factor which gives a highly desirable impetus to popular use of aircraft.

From the experience of the British builders of the Avro, we will guide ourselves in a great measure. We will approach the market much as they have approached it. We will offer the same inducements and appeals.

The design of the plane is one which should meet with wide approval. The craft has folding wings which have stabilizer effect. It has the Handley-Page slots which have proven themselves in many instances and are particularly suited to a plane as light as the Avro. It is a lightweight

it is contrasted with the least understanding of control and a fine application of that comprehension which is substantiated by Lady Mary Heath's statement concerning her special solo flight.

The purchase price of the Whitley Avian will include the well-known 95 hp, 4-cylinder-in-line Conquest Mark III engine. We have an armed record in this country of the operation cost of an Avian which is worth quoting: William H. Hooker of Boynde, L. 1, kept a record of his expenditures for a period of five months. In that time, his plane was in the air 79 hr. and 29 min. and ground time added to that was 24 hr. and 17 min. The engine used 369 gal. of gasoline and 84 gal. of oil. Miscellaneous expenditures totaled \$41.84. It is estimated that he covered 7,100 miles in that time. Such a record will appeal to the man who has left that ownership of an airplane is prohibitive, for this cost is only about 3 cents per mile above the cost of an inexpensive automobile.

Not only will private owners feel attracted to such a plane, but light-flying clubs, such as are so popular in England will spring up in America. A small group can afford to own a light plane. They can afford to operate it and enjoy all of the advantages which are provided the man who would learn to fly in an expensive manner.

In specifications, the Whitley Avian will follow the Avro in detail. The wings will have a span of 28 ft. when spread and 54 ft. folded. The plane will weigh light 875 lb. and 1,000 loaded. It will have a maximum speed of 102 to 105 m.p.h., a cruising speed of 85 to 90 m.p.h., and a landing speed of 25 m.p.h. It will have a ceiling of 18,000 ft. and a cruising range of approximately five hours.

In considering the performance, the low operation cost and maintenance and the excellent inherent qualities of the Avian design, we believe that production of the plane will grow increasingly coincident with the demand which will naturally evolve from appreciation of the model.

H. N. WHITELSEY

President

Aircraft Products Corporation of America

IN OUR ATTEMPT to serve a large number of the leading aircraft manufacturers, we have found a very definite need for further standardization of such parts that do not affect the individual features of a given airplane design. All would benefit by the economies of manufacture, obtained through the use of standard parts, which would enable the parts builder to eliminate expensive set-ups and secure larger production runs.

Our experience as the manufacturer of "Chloridec Stream" has indicated that end fittings for struts were not themselves very readily to such a standardization program. It has been found that fundamentally, all such fittings, together with the universal end caps, can be of a similar design, varying only in the dimensions and in many cases, this variation is only in size. We have already appointed a number of our users and found them very willing to co-operate with us in such a program, so that at the present time several manufacturers are using our standard fittings.

This is only one of the many instances that might be cited. A general program of standardization which

would reduce production costs would result in a surprising reduction in the final cost of the airplane. At the present time, such manufacturers in making may carry special parts in small quantities in his own shop, which bear very close resemblance to similar parts being made in the plants of other manufacturers. If these various parts could be standardized and made by the parts builder in the increased volume which would result from such a program, they could be purchased by the airplane manufacturer at a very considerable saving.

Ralph P. Phelan
President

The Pyle-National Co.

THIS WEEK at the All-American Aircraft Show we are featuring a new type of field boundary cone light and fixture. This lighting fixture is a standard, wing-panel fitting with a plate of clear, green, or ruby glass as specified. The cone is 24 in. high and 304 in. in diameter. A 14 in. copper chromum plated reflector focuses the light on the cone. With this type of boundary light a landing field is clearly outlined both day and night. The size, shape, and color of the fixture could be altered also, and during the daylight hours, while the reflector used for intensifying the illumination of the cone at night assures that it will be clearly visible, offering good indication of the location and height of the boundary light fixtures above the ground. The reflector also presents the direct light from reaching the eyes of pilots who are making their planes.

We have received many favorable reports from the various airport engineers on this type of fixture, particularly due to the added illumination given the cone at night and, incidentally, for the reason that with each one of these boundary light fixtures we may use a junction box for the underground cable mounted above the ground, which is much more accessible for repairs than the underground type. Besides the boundary light fixture, we are also featuring aircraft "navigation" or "warning" lights for day and night use. These flashing lights and warning lights are now being used by a number of aircraft manufacturers. In fact, at the show, our landing lights in the retractable, built-in and attached form may be seen on four six to eight planes.

Ed Lipp
Sales Engineer, Air Transportation

W. J. Savage Co., Inc.

WE ARE GLAD to be in the Show and to have the opportunity to exhibit and talk about the New Stearns Gray Miter Cutter, a machine, or rather a machine, is really as essential to the shop cutting or rather sheet metal shapes as the hand saw is to the wood working shop.

We are frank to admit that the previous model did not always perform on the job as well as it did in our shop as tests. Sometimes this was not the fault of the

machine—it was something new—the operating air was new—a great deal of the trouble was due to improper operation and overloading. However, mechanical details of the working head have been perfected to reduce vibration to the minimum, the tool holding device and tool has been improved so as to insure proper holding of the tool as machine head being the steel air being out, tests have been made to determine the proper hardness of the cutting tool and die.

The use of the machine is varied, but its main purpose is to eliminate hand cutting or drilling out of shapes or designs in flat stock, and to permit the depiction of designs, simple or intricate, by the use of a template. In other words, this Gray Miter Cutter will first cut the design or template to a desired line, and then cut as many duplicates of the template as are required. A machine which will do this is naturally a valuable tool to the aircraft industry as the labor saving is great.

We are showing the New Stearns Gray Miter Cutter at the All-American Aircraft Show because the aircraft builders are using it and have used it, and also because the new management of the Savage Company wishes to meet these users and prospective users and show them what has been done to eliminate operating trouble.

H. A. Chisom
President and General Manager

Travel Air Company

TO WHOM ARE WE TO GO? Travel Air planes has been a matter of intensive study on the part of our nation's organization. Surveys have been made by our Sales Division in various sections of the country to determine what classes of business men are most interested in the purchase of an airplane at this time and the sales approach that we must endeavor to use.

These surveys have clearly established the fact that an active and immediate interest in airplanes exists in every business organization of size where the saving of time is an important factor in the conduct of its business. This means that those employees, "highly" selected fully realize that the saving of a business's time is necessary to meet the business competition of today. The same argument exactly applies to the leading executives of the aggressive corporations and business institutions of the country.

Travel Air planes have been sold for many business purposes, including the use of field executives and operators, owners of department stores, chains, and stock and bond companies whose members travel over comparatively wide areas of territory. The airplane industry, however, is not as yet old enough to be able to clearly clarify the sales efforts upon which most of the selling efforts can be centered with the help of the present survey. The answer in this respect lies in the fact that officials of practically every business institution are thinking about the use of an airplane in connection with business, but that these limitations, for one reason or another, must be they buy, re-ship



The J-6 powered
Boffano CII monoplane

Right: A
Subsonic powered
Aeromarine-
Klemin
monoplane



Left: The LeBlond engined Boffano NDB



Right: Three-engined (Velle)
Kreutzer Air Coach



Below: A Doyle "Gracie"
With a LeBlond engine



selling, and organization policies in line with the greater territory that can be covered in a sales and merchandising way by a lower number of offices.

As a result, we of Travel Air feel that the airplane market at this time must be considered as a whole, and that prospects must be sought out from every line of business rather than the covering of sales territories upon one or more specific lines of business. The problem is the drag net kind of searching out the live prospect and then going through the various selling steps and activities that are necessary to bring him to the point of purchase. We mean by this that few business institutions are able in a matter of policy and orderly procedure to reach a decision over right as to the purchase of an airplane. This decision is a process of evolution and development in the minds of the company officials as a whole. The psychology seems to be just this. This was or more of the officials becomes involved, reduces the need of an airplane to some true and better must comparison, and then a step at a time starts to sell those in his organization, who have a voice in making the decision.

In another step, Travel Air believes that it will be able to analyze the market by classes of business to such an accurate degree that for the 1937 selling season it will be possible to concentrate upon a full class or in leading lines of business, at the same time vigorously working to bring other lines of business to the same favorable attitude. The merchandising of an airplane to a customer is also to the selling of an automobile for true saving use in business. The airplane is merely a glorified automobile with the sky for its travel and its traffic signals or cross roads to guide its flight. As a result, the successful airplane salesman of today makes a study in advance of the prospective customer's actual business conditions, the extent of his competition, the size of territory he covers, the number of salesmen he employs, the needs per year that the executive should be in the field on personal inspection and business travel, and countless other problems. The salesman thus equipped with the facts surrounding the condition of his prospective purchaser is able to talk convincingly in terms of actual profit to the customer through saving all time.

W. H. Harrison

Wilson Steel Products Co.

WE HAVE INTERESTED ENTERTAINMENT FOR THE future of the industry. Our contribution to aircraft is the Aero Control, with which we have had considerable success. We have secured its adoption by many of the larger manufacturers of planes and find all of our users are our enthusiastic boosters.

The thing that strikes us most favorably about our dealings with the aviation industry is the high type of men we meet, and the courteous treatment we receive from everyone with whom we come in contact.

J. Paul

Doyle Aero Corp.

THROUGH THE 25 years of airplane development all attention has been centered on the mechanical construction and aero-dynamic research in direct application to the air machine.

Well defined principles have been evolved from this painstaking work with the resultant success shown on every hand and now attention is more or less suddenly being thrust to the merchandising and control of this new creation, which brings us to the greatest problems confronting aeronautics at present—the legislation and commercial exploitation.

The United States Department of Commerce has taken great care to go slow with legislative measures, always working with experts active in this particular line and promulgating rules and regulations as developments required so the Department is to be congratulated on the sound progress made in this work.

Regrettable this is not the case with many states where the new child of the air, now so much in the public light, is subject to ridiculous barriers and limitations that will prove insurmountable. The recent proposed legislation of Maryland is just one example of needless legislation without fundamental knowledge of the needs of the particular subject at hand. Let each and every one of us lend our weight and experience in striving to forestall hasty unusual legislation.

On the other hand, a more strict enforcement and checking up of present operators under existing laws is very desirable. This may call for a greater study and increase in personnel of the Department of Commerce as well as the Aviation Department of states where laws are enacted but will surely wipe out a bad situation which is evident in many localities at the present time.

Schools have been formed very often by enthusiastic pilots of experience but lacking the business understanding necessary to grasp the limitations imposed by legislation purely to forestall the loss of human lives. Schools enrolling students without having first passed a satisfactory physical examination are an operating on a sound basis and should be dealt with in a strict manner because at the beginning is where trouble should be located—not after a crash. A frank listing of these facts is desired.

The commercial angle is the other problem confronting aviation at present and the outstanding factor in this is sound distribution methods. The demand so far has been so partial that companies producing commercial planes have had to pay very little attention to this side of the question or have ignored it by simply overlooking each side to an endorsement or school a potential distributor. There are a few notable exceptions to this by companies who have found the problem and established a distribution organization similar to that used by automobile manufacturers.

The small manufacturer, up to this time, has been able to sell his output by what amounts to plans, every-day, direct selling although he is prone to consider none of his sales as a distributor's, none giving discounts on one or possibly two machines that are not legitimately earned by the purchaser as in most of these cases he is a man who is selling to sell of the opportunity arises. This class of purchaser-distributor is not in a position to give the service that is required or should be expected by the average plane owner and will lead to untold

difficulties for the manufacturing company that follows this plan.

A real trouble distributor should be required to work on an aircraft bus applying a load or other suitable guarantee to insure his moving the required number of planes during the contract period. An incentive to go after business is made this way and will stimulate the organization into a real active sale. This will also allow the manufacturer to place spare parts of a suitable number for the size of the aircraft undertaken by the distributor and thus eliminate unpleasant delays in repairing and refitting customer's planes.

More attention to the sales end of the business is being required daily and the manufacturers who build up size and of his organization to be on as sound a basis as his mechanical end, will be the one to survive the shakeout period which the industry is fast approaching.

John R. Simmons
Secretary in Charge of Sales

Swift Aircraft Corp.

THE SWIFT AIRCRAFT CORP. is exhibiting three planes at the Detroit Show. Two of these are two place sport airplanes, finished in the three tone effect of black, red, and papilion crests. This makes an altogether pleasing appearance as this semi-military sport plane.

The plane exhibited on the floor is powered with a Kinner engine, and showed 130 m.p.h. in speed indication on the test flight. It is equipped with dual control, upholstered in black and papilion, has a large comfortable front seat for the passenger, owner, or pilot, with arm rest and is upholstered in genuine papilion leather. The rest of the sport planes have single rows, and are so designed that either a seat cushion or a seat type parachute may be used.

The other sport plane is powered with the Wright J-6 150 hp, 5 cylinder engine, and is at the Ford Airport for demonstrations for all those who are interested. It is equipped with dual control, upholstered in both cowhide, leather and wheel brakes. Extra equipment consists of a starter and horn and bank indicator also other accessories being furnished as standard equipment. A large ample baggage compartment of weather proof construction is in the rear of the plane cockpit. The fuel compartment is built in front of the front cockpit. This plane is also finished in a three tone combination, of black, red and papilion crests. On all sport planes the cockpit is entered by means of a large door which opens downward. All doors are hinged on heavy piano hinges. The baggage compartment of the sport plane can also be entered through a jowl lock of the pilot cockpit. Both doors carry a key lock.

The stress analysis have been completed by H. E. Wertheimer, consulting engineer of Dayton Ohio and have been forwarded to the Department of Commerce through the Washington representative of the Swift Company, C. L. Offenstein. It is expected that due to the thoroughness of the preparation of this stress analysis there will be little delay encountered in obtaining an Approved Type Certificate. In fact, the Swift Company are going ahead with production at the rate of one sport plane per week.

In addition to these two sport planes, the Swift Aircraft Corp. is also exhibiting a recently developed sport type of touring plane. This is also a two place job, and can be powered with engines from CN-3 up to and including the Kinner and Warner 110 hp engine.

The writer and W. R. Riddle, president of the company, will be in charge of the exhibit.

W. R. Riddle
General Manager

Kellon-Arund Manufacturing Co.

WE ARE MAKING all kinds of transportation seating equipment and selling to a number of airplane manufacturers. Our exhibit at the Detroit Show, consists of several types of airplane seats.

While we are, no doubt, the oldest producers of testing equipment for airplanes, the whole proposition is still a young one and there are so many questions that must be solved by the testing equipment engineers and the airplane designers engineers that radical changes will no doubt be made in the present style of seats. Our company has made and is still making an exhaustive study of the requirements of the cabin plane manufacturers, as far as seats are concerned, and we believe we will be greatly benefited by the results of our working with so many airplane producers at the Detroit Show.

W. R. Riddle
Manager

Continental Motors Corp.

THE PAST TWO YEARS have witnessed tremendous advances in aircraft design. This has been made possible by new engines developed to meet the increased demand. But so quickly has the industry developed and so great has been the demand for engines, that the supply of available power plants has not been sufficient. Many aircraft manufacturers have been unable to lay out progressive programs because of the inability to obtain engine equipment. The increase in demand has brought to many of the wartime engine manufacturers a realization that many aircraft manufacturers have five or six different engines which they are prepared to furnish.

The multiplicity of engines for any scale of plane is obviously uneconomical but has arisen out of a necessity. Every time a different engine is used the fuselage must be altered to provide the proper support and the cowling must be suited to each power plant. Moreover the variation in power of the available engines influences the design of the aircraft. This necessitates a large number of models thus dividing production and making standardization impossible.

Aerovia is passing through much the same phase of growth that attended the rise of the automobile industry. There are many companies engaged in building airplanes with varied facilities. Many of these enterprises, at was the case in the automotive field, will pass out of the production picture. It will be the "survival of the fittest" and those builders who look towards

standardizing their products and employ progressive methods of construction will be the dominant factors in this new industry.

The principal point of standardization will be the power plant. Instead of offering a number of different engines with varying characteristics it will be found more advisable to select an engine, which when associated with the plane design, will give the best results in speed, loading and economy. It will then be a question of selling on a performance and price basis. For manufacturers who build two or three different sizes as planes, the economy in obtaining engines from one engine source with the interchangeability of parts that would be available on different size engines, would be very great.

Continental Motors Corporation is to be in a position to avoid this standardization problem is a very material way. The first engine to be produced is a seven cylinder model in the 150 hp classification. This is on exhibition at the All-American Aircraft Show in Detroit. Other engines will be offered later in larger and smaller sizes so that soon a complete line will be available to satisfy the power requirements of all manufacturers. The production program will be on a scale which will provide ample quantities of these engines to protect the most progressive aircraft building schedules.

The facilities for research available in the Continental organization will be constantly employed to insure the most up-to-date designs. In this manner Continental will make its contribution to aviation and assist in making this new industry a force in the business world.

Chas. P. Russell
Manager, Aeronautical Sales Division

DeWalt Products Co.

A MACHINERY EXHIBIT of considerable interest, which is being shown at the All-American Aircraft Show, is that of the new, principal metal cutting saw developed by the DeWalt Products Company, Leola, Pennsylvania, known as the DeWalt "Wonder Metal Worker" for cutting seamless steel tubing and flat stock. Great advancement has been made in production methods within recent years and the DeWalt "Wonder Metal Worker" has had a great deal to do with this increased efficiency.

In cutting cylindrical metal tubing and flat stock before the development of the DeWalt metal cutting saw was a tedious job by hand or by other methods. Now the cuts can be made in a fraction of the time formerly required and all angle cuts are made accurately as well as cuts in flat stock.

The DeWalt "Wonder Metal Worker" is a 5 hp. overhead, direct drive, circular metal cutting saw which is adjustable to any angle-cutting and will handle tubing up to 3 in. in diameter, 1/2 in. wall thickness, making a clean, accurate cut.

The saw is made in a 12 in. hollow ground, metal cutting saw which has surprisingly long life. In cutting 1/2 in. mild-steel metal tubing the average life is from 4 to 5 days before new blades, when it is touched up, are on an ordinary hand file. Eight to ten days in the usual service on low carbon steels before resharpening. For even regular feeding of the saw through the material,

a manual switch feed is provided on the arm of the machine. This produces a smooth cut for clean painting.

For building the work, as a grip vice, developed by the engineers of the Travel Air Manufacturing Company, Waukegan, Kansas, which firmly grips and holds the tubing the desired length, is available with the DeWalt, which operates from 30 to 150 lb. air pressure. The jaws of the vice are adjustable to handle tubing up to 3 in. in diameter. It is quickly and simply in operation and is recommended wherever cutting is done on a production basis.

Over 80 per cent of the planes exhibited at the All-American Show this year have been constructed by the use of the DeWalt "Wonder Metal Worker." These owners include the largest manufacturers in the field as well as a number of tubing manufacturers, who use it in their production.

The DeWalt "Wonder Metal Worker" is recommended wherever there is any cutting to be done in stainless or welded tubing and flat metal stock, as the machine can be used very profitably on production work where a smooth metal cut is required. The DeWalt "Wonder Metal Worker" occupies a space of 26 in. x 14 in. and does not cost more than 30 cents per day for operation.

PAUL GARDNER
President

American Aeronautical Corp.

ONE COMPANY, which has secured the license to manufacture the well-known Swiss Morhart flying boats and amphibians in North America, is exhibiting one of the model 5.62 flying boats at the Detroit show. This machine has a high speed of 134 m.p.h., a cruising speed of 118 m.p.h. and a landing speed of 52 m.p.h. with a 2,200 lb. load. The service ceiling is 13,779 ft. The boat will climb to 5,640 ft. in 2 min. 25 sec. and will descend to 22 ft. in 22 sec. This remarkable performance, which is obtained with the usual 500-750 hp power plant, may be attributed to the high aerodynamic efficiency of the wing section that is used and to the great attention that has been paid to the hydrodynamic lines of the hull.

The 5.62 has been developed as a fast and powerful transport, which can be used commercially or privately, for either passengers or mail. The maximum disposable load is 1,200 lb., although the plane has listed as much as 4,400 lb. for second purpose. There are cabin accommodations for seven persons, and two bunks are provided for use in getting in and out. The pilot and mechanic or the extra passenger are seated in the forward part of the cabin, while the other four persons that the plane will carry are seated in the rear. By this arrangement there is no difficulty in communicating with one another. Also, exceptional visibility is provided for all. Another feature is that the boat can be transformed into an amphibious vessel easily with the installation of a special retractable landing gear to be manufactured by the company.

Over water flying is something that has not been developed in the United States as much as it might have been. In fact, there are very few manufacturers of flying boats and amphibians in a realm of the trust that the industry has taken. There is a definite field for the water craft, however, and the American Aero-

Right: The twin-engined
(Wasp) Sikorsky S-38
"Amphibian"



Left: The Eastman
flying boat with a
Succoway engine



Right: A "Wasp"
powered Loening
cabin amphibian



Left: A "Wasp" engine
Vought "Corsair" with
amphibian landing gear



ennial Corp. in bringing the Succoway Marchetti line to this country to aid in developing that field. The S-62 on display this week in Detroit is the forerunner, so far as America is concerned, of the Succoway Marchetti boats and amphibians to be manufactured in this country. Succoway Marchetti airplanes have been launched in less than 12 yr. Over 2000 of them have been built abroad, and all have established records for efficiency, which have proved them leaders in their class. The second flights made by such well-known pilots as Marges de Ruedo and Arias Ferrera are merely samples of what has been done in Europe with these planes. It is safe to assume that equally great records will be set by the American Succoway Marchetti flying boats and amphibians in the future.

Stewart Hartshorn Co.

IN THE YEAR 1917, when our country entered the World War, there came a demand for streamline wire tie rods. There was no existing specification surrounding such a product in this country and the Government had made extensive plans for the production of airplanes, which, if equipped with streamline wires, would result in far more efficient performance. The Stewart Hartshorn Company had produced an extremely high grade chrome wire for many years and the facilities at its plant were found ideal for the production of tie rods. After extensive tests this concern successfully developed streamline wires which were then met the most exacting requirements laid down by the United States Government.

Hartshorn Streamline Wires are drawn and cold rolled from the best quality of electric furnace carbon rod obtainable and, by special heat-treating processes, a wire of high tensile strength and excellent ductility is obtained. Hartshorn Streamline Wires are produced by the cold wire rolling method which the company has succeeded in developing into a high degree of perfection. No equipment was too tedious to undertake both for its own satisfaction and as a result of the United States Government (for whom it was under contract for a considerable number of these wires) and as a result of its experiments, the Hartshorn Company is producing streamline wires which more than withstand the hard usage to which they are subjected. The cold rolling method produces a wire in every way superior to that made by any other process yet devised and, whereas the streamline section by several passes through a rolling mill, as is done, best treatment of the steel is avoided, which must be experienced when swaging or similar processes are used. Very complete tests were made at the Stewart Hartshorn Company plant and other plants by representative of the United States Army and Navy to determine the quality of the products and the Hartshorn Company will, upon request, be glad to furnish more detailed information upon that subject. Streamline wire tie rods are opposed to the use of cable bracing, offer very much less resistance to the wind, enabling the plane to give much higher speed, which is very much more for the manufacturer a more economical plane.

Approaching the demand for a satisfactory internal tie rod, the Stewart Hartshorn Company, during the year 1926, developed a square section internal tie rod which supplants the old swaged type and has been adopted as standard by the Army and Navy. These rods are pro-

duced by a special method devised by its engineers and yield a product of excellent quality. This type of rod is strongly advocated for all internal bracing and wing bracing.

All Hartshorn Tie Rods are subjected to manufacture to stringent tests, multiple test of wire to ascertain that the properties called for are being maintained and the same high tensile and ductile properties found in the streamline wire in the square internal tie rod. The company fully realizes the most exacting conditions which the rods must meet and there is to produce a wire which will not only meet the regular specifications but one that will also prove even and dependable in manufacture. Hartshorn Tie Rods are made with cut threads held to a very close tolerance to prevent threading in a most important factor in the safety of the wire. All wires manufactured are subjected to a proof test load equivalent to 150 per cent of their specified breaking load before leaving the Stewart Hartshorn Company's plant.

Practically all designers of aircraft find it necessary to brace their ships with tie rods either externally or internally, and, in most cases, both types are used. The square section internal type tie rod is used for bracing wings and fuselage internally. Where flying landing and airframe bracing are required, the streamline section is employed. Landing gears and tail sections are likewise braced with streamline. For other aircraft commodities offered a more general use throughout aircraft.

At the All-American Aircraft Show in Detroit, the Stewart Hartshorn Co. is exhibiting a full line of internal and external tie rod lineages, along with specimens of raw material and material in process indicating the physical properties of their rods.

John Hartshorn

Huskie Manufacturing Corp.

DIRECT SELLING is undoubtedly our most satisfactory sales outlet. This is particularly true where the large manufacturer is concerned. By this method we obtain personal contact with the buyer, and his needs or problems can be brought directly to us. Individuals and some of the smaller concerns are handled by our jobbers. This works exceptionally well in some localities.

The aircraft show has unusual educational value. It is a place to see the exhibits, the manufacturers and engineers, and the public. Aircraft shows give the exhibitor a unique opportunity to display and advertise his product to those who are most interested in it. It is here that the manufacturer, designers and engineers meet. The exhibitor obtains personal contact with these men; he can directly discuss their problems and requirements. The manufacturer, engineer, and designer benefit in much the same way. They can make direct comparison between products, and select that which best meets their needs. They can bring their problems directly to the supplier who is an exhibitor and have an opportunity to see the new features and developments shown.

Last, but not least, the aircraft shows are of great benefit to the general public. It is the only place where

it can use the raw materials and finished product together. The public moves in, and buys airplanes, uses them for freight and mail, and may even own stock in aircraft companies. Eventually the problem of selling anything reduces itself to the education of the public, and it is in the aircraft phase that the public can learn about aircraft and its manufacturers. Aircraft shows are milestones of progress. It is here that new lessons are most advantageously exhibited.

Perhaps the largest problems confronting the development of aeronautics at this time are the delivery of aircraft, the training of pilots, the creation of laws governing the manufacturing and piloting of planes, comfort, and safety.

This last is the most important. Rapid progress is being made in night flying, the development of airlines and commercial flying. We lead the world in aeromarine, but despite this fact, air disasters are not infrequently the most serious. It is imperative, therefore, that flying be made absolutely safe.

One of the features of our exhibit are insulation panels. The creation of luxurious air liners has produced a demand for the utmost comfort in flight. Good cabin planes provide for protection against the wind, but at the present time they do not furnish sufficient resistance against noise and cold. The Haskelite Manufacturing Corp. is endeavoring to produce a stiff, light panel having excellent insulating qualities. In addition, we are showing Haskelite, Plymet, Aluminex Plymet, Duratrim Plymet, Balsa Haskelite, Balsa Plymet, and different sections of wing ribs, wing edges, dash boards, instrument boards, floors, etc., which our customers will furnish us for calibrating purposes. A special display of wing beam webbing in spruce and mahogany is being shown, also panels in thicknesses of $\frac{1}{8}$ " and $\frac{1}{4}$ ".

Our Company is being represented by C. E. Smith, sales engineer, G. M. Haskela, sales engineer, and the writer.

James H. Haskela
Vice-President and Secretary

Mahoney-Ryan Aircraft Corp.

We are progressively adding how we find prospects for airplanes. During the past year, in which nearly every manufacturer enjoyed more business than his production could take care of, the question was easily answered. In other words, prospects did not have to be found—they appeared with money in hand and demanded for delivery date. By far the great majority of sales went to commercial operators who were tending to use planes solely for making profit directly. Heavy operator of a non-surplus "Jenny" or early type open plane was the possibilities of profit in offering the public rides in the new type closed cabin plane. The task of determining the aircraft market was not a difficult one when the profits of pilots hawking in five and ten place cabin ships and even tri-motors became known about the country.

For the coming year, however, the aeronautical industry seems fairly well served that new markets must be sought and demand created among corporations and

individuals in order to consume the production for which they are preparing.

During the past year flying has been found to be commercially profitable for many business organizations, most prominent of which are probably the oil companies. However, other large corporations and individuals with widely varying interests which take their own considerable territory are finding the plane not only a great convenience but almost a necessity. Flying has been made widely popular through the introduction of America Country Clubs and the adoption of the air yacht by people of means, as a companion to water-yacht.

Early in the year the Mahoney-Ryan Aircraft Corporation decided to determine for itself just what interest manufacturers, officials of large corporations, railroad, etc. had in aeronautical development. Accordingly a mailing campaign was inaugurated and results showed were comparable to the most successful of general campaigns. It was of course, impossible to determine in advance whether or not a letter from an aircraft concern would actually reach the desk of a business executive. Apparently a letter from such a company was sufficiently unusual to get it by the first line of defense, and replies were secured in the personal handwriting of some of the country's ablest businessmen.

The campaign was designed, not as a technical selling talk, but as a plan to increase air-mindedness among American business executives. Thousands reply cards were mailed to facilitate the reply of the prospect and the quantities in which these came back was surprising both to the postal authorities and ourselves. The object of the reply card was to secure one of the new catalogs of Ryan planes which had been damaged along the lines of the most elaborate automobile catalog. The same was mailed purely as a source, dependable means of speedy transportation of the literature.

It was intended to convey the feeling of comfort and implied safety through the luxury of appointments and taste in design. The plane was shown as an accessory to business and a new adjunct to sport and outings. Adaptation to business and the pleasures was suggested by reply cards of great volume, the character and performance of the plane itself was shown. The whole atmosphere of the catalog was one to inspire confidence through association with every-day means of transportation such as the automobile and yacht. Dual control was featured on to show the simplicity of operation and ease with which the novice owner could handle himself to fit and the necessary technical data and specifications were included in a few pages at the back of the book.

We feel that with this initial step and with the proposed campaign of mailing for the future, that we are "washing a new and unperfected market." The commercial market newsworthy in, of course, not being supplied by any means. The Mahoney-Ryan Aircraft Corporation has approximately 35 distributors in this country and half a dozen more in foreign countries and these are constantly being contacted and assisted by a group of field men who are demonstrating the planes and following up the prospects in catalyzing demand.

Concentration of production on one particular model has always been one of the first principles of the Mahoney-Ryan organization and the six-place dual-controlled Bonanza with 300 hp. Whirlwind engine, introduced at the first time at the Detroit Show is new design, is the standard production for this year.

Our sales plan does not attempt to compete with that of manufacturers of large transport planes, nor that of small open sport planes. It is not selling, however, that there is a very definite market for a plane of the bonanza type is now on faster lines and as well suited to main airlines in the carrying of parcel loads. It is also a practical plane for manufacturers who do not desire to be bothered with the great overhead of the large transport plane and have a minimum of operating expense.

The aircraft market is undoubtedly going to become more definitely classified according to the carrying capacity than has the automobile market, and the Mahoney-Ryan Aircraft Corporation feels that its place is definitely in the medium-sized single-engine field.

R. D. Mahoney
Assistant Sales Manager

Ex-Cell-O Tool & Manufacturing Co.

When I now to the leaders in the air, I take this opportunity to "point with pride" to Ex-Cell-O's relationship to the aircraft industry. Ex-Cell-O is now making precision metal parts for 17 different manufacturers of airplanes and airplane engines. Included in this list are found most of the leaders of the industry to whom we supply such precision parts as valve guides, valve tappet rods, pins and rollers, cam rollers, piston pins, valve tappets, connecting rod bolts and propeller hub bolts and all types of precision, drilled thrust studs. Ex-Cell-O has always been a precision shop, working to close limits. An airplane work is held to particularly exacting specifications with extremely close tolerances; therefore, the engine manufacturers immediately looked for some source, already equipped and trained in that line of work, to produce their small parts for them. From the steady increasing volume of our business, we are of the opinion that these manufacturers have recognized their choice of Ex-Cell-O.

W. A. Howard Smith
President

American Cirrus Engines, Inc.

THE REPUTATION of the American Cirrus Engines, Inc., at the Detroit International show is fostering the new American Cirrus engine sold the world's aircraft manufacturers and is which Cirrus engines have been installed. The three great advantages of the American Cirrus engine are also being asserted. These are first, its simplicity of construction, secondly, its well-proven reliability, and third, its "in line" design.

In the designing of the Cirrus engine, it was decided that it was most important to begin with a form of construction that would create and retain the confidence of the private owner. Therefore, a design was chosen with which the average owner was familiar, namely, that of the in line automobile engine. Cylinder heads are recessed into the cylinder and cylinders are likewise recessed into

the crankcase, joints of the cylinders and heads being made by bolts. The connecting cylinder with head is secured to the crankcase by means of four steel studs projecting from the crankcase and passing through holes in the cylinder head. This simple construction allows the heads and cylinders to be easily removed without taking down the engine. The same simplicity is followed throughout the construction. In construction, the engine has the advantage that it requires no greater skill for its maintenance than an ordinary automobile engine.

The second advantage of the engine is its intrinsic reliability. Its records in performance are known the world over. From England to Australia, England to South Africa, across the continent of Africa, back and forth across the United States, Cirrus engines have been flown in long distance flights. They are used extensively from the wildernesses of Northern Canada to the southern tip of South America, in England, France, Italy, India, Egypt, Persia, China, Japan and Australia. Flying in these countries in the extremes of temperature and adverse weather conditions, they are continually doing their work with reliability.

The third advantage of the Cirrus is, that owing to its line design, it may be mounted in the most dry of most dry places and in the most adverse weather conditions with no loss of engine efficiency. This advantage counts a great deal to the private pilot and sportsman pilot. The natural sales outlets for the American Cirrus engine are the light aircraft manufacturing companies, operating companies using light aircraft, flying clubs, individual pilots and sportsmen. There are three main factors that have a direct bearing upon these outlets. They are first, the growing popularity of private and sport flying, second, the great need for training and sport planes to be sold at a reasonable cost, and third, the increasing popularity of the in line engine for planes, at a medium of seeing greater forward visibility for sport flying.

Private and sport flying is that taking a great hold in the United States. Flying schools and clubs and aviation country clubs are being formed the country over, and they are attracting to their membership hundreds of persons who are desirous of learning to fly. It is in this line of seeing greater forward visibility for pleasure and transportation. These people are not entering the field of aviation with the intention of making it their business. They are those who can well afford to purchase and maintain planes for their own amusement. They also will use light planes as a means of personal transportation because of the advantages of speed and comfort. In addition, small training planes will be needed badly in the near future. Up until this time, there have been practically no engines built for private and sport flying and the Cirrus engine supplies a power plant that is ideally suited for training purposes.

ALLAN C. HOFFMAN
Vice-President

The Austin Company

It has been known at the Detroit aircraft show, we are exhibiting a highly model of a modern airport, complete of airport surveys and reports, catalogs, photographs of airport buildings, fixtures, etc., which have been designed, built and equipped by the Austin Company as architects, engineers, and builders of airports. Five members of the staff are representing our company at



Left: A Whitehead
powered Cessna
monoplane



Right: The Laird
biplane with a Whitehead
engine



Left: The Whitehead
powered British
monoplane



Right: An OV-5 Kreider-
Bremer "Challenge"



Left: A LeBlond
powered Arrow
Sport biplane

the show. These are W. J. Armlin, president; G. A. Bryant, Jr., vice-president and general sales manager; A. F. Plant, District director manager; J. C. Prosser, assistant manager of the Airport Division, and W. E. Arthur, manager of the Airport Division.

The Moto-Meter Co.

WITH THE AIRPLANE INDUSTRY now on the threshold of becoming one of the greatest of modern achievements in transportation, the manufacturer and operator are now faced with the problem of creating a public market for their products and services. Creation of this market is essential before the industry can assume the rank predicted for it by those who look ahead.

Production of airplanes in the past few years has in number, been far below the demand. Potential operators have had to wait weeks and months for planes before they could start their lines. What service they were able to provide was readily used and the market seemed to grow every day.

Faced with this increasing demand for more and more planes, the manufacturers naturally initiated expansion programs. Some of them are so large as to cause apprehension when the future is considered along with the rapidly changing lines of demand.

During 1938 there were approximately 5,000 planes turned out. Production schedules for the present year forecast more than double that number.

This increased production has enabled dozens of operators to complete their equipment and start services which, during this summer, will cover the United States with a network of passenger, mail, and express lines. As soon as many of the lines started it was discovered there was a heart to the present day demand for service from the public. A reaction is setting in that is now having its first effect on the producer in that they are aware that they must give attention to salesmanship as well as to plane building.

It is apparent that the airplane has not quite been removed from the spectator to the usual commercial in the public view. The tremendous interest created by the pioneer and during early flight sessions, but it is a slow process in converting it into a realization that airplanes offer service to the ordinary layman as well as to the wealthy sportsman.

Such a condition brings in the industry for the first time the problem of selling its wares. If all the planes built this year are to be sold there must be people willing to take advantage of the mail, passenger and express service that will provide. Of course not all manufacturers and operators are confronted with this problem. Many of the major concerns are still far behind in orders and active service between communities. It is generally conceded that the market needed will not come from the man able to buy his own plane but from the man in the street, the man who still looks to the dealer when he buys the dream of an engine overhaul.

Mail and express are the only classes of service now within his province. Passenger fares will eventually be so low that this medium of travel will also become popular. One of the most important methods for carrying the aircraft message to the public is by the ground show. In one of these exhibitions the man who will supply the future market for service is able to give the

airplane close inspection, see how it operates, and is informed of the demands and one way the airplane will help him.

Possibly even more important is the opportunity an aircraft show gives to the future users of airplanes, the boys and girls of school age who are up to the minute in their knowledge of aircraft and who can ask questions that back the old timers right and left. They are the ones whose confidence will bring about trans-Atlantic service and other such projects. An aircraft show such as the Air-America is worth the effort.

The Moto-Meter exhibit is in the charge of Henry C. Beaudou. Others attending are Roy P. Herley, chief engineer, and R. L. Carey.

George H. Townsend
President

AC Spark Plug Co.

THERE IS NO GENTLEMAN, that the progressive development of aviation, especially in the past two years, has been the outstanding achievement in the world's industry. And there is no doubt that aviation, year by year, will show such phenomenal gains that within five years, perhaps, the more "restraint industry" as applied to aviation, will cease to be. Aviation today has really passed its infant stage and actively engaged in the industry are some of the country's oldest, most conservative and most substantial concerns and individuals. They would not be passing their capital and efforts into aviation unless they had the utmost confidence in it.

In the aviation sense, aviation has not such a new industry. It is a transportation business in a new form. It is fortunate in having had the experience and facilities of individuals and firms long engaged in the transportation field—the engine manufacturers, maintenance and accessory makers, tire makers, body builders, etc.

Aviation has made its great headway largely due to these agencies and through the persistent efforts of publishers. Today many newspapers are carrying accounts devoted to aviation and some of the foremost trade magazine editors and publishers have entered the aviation field. And any future history of the progress of aviation deserves a great big chapter devoted to the important work that has been done by editors and publishers in promoting aviation. Publishing for the aircraft industry has been responsible in a very great measure for the rapid strides of the aircraft industry.

Just as newspapers of the air added glories to aviation achievement manufacturers and engineers have also done their part in the development of more engines and other devices to keep ahead and even ahead of the industry's progress. The simplest and most efficient engines were developed, numerous improvements perfected and every component part of the airplane improved.

The important part played by spark plugs in aviation was made possible by engineering development and the AC Spark plug, selected by Cloughly Byrd, Chamberlain, Stinson, Schell, Brock, Horthland, Haggenberger and others were designed and developed long in advance of the special demands made by the new type of engines, particularly serving the ideal that anticipated the needs of future engine requirements.

The AC company now is engaged heavily in research work along aviation lines. One staff of engineers, numbering some thirty-five technicians, is devoting a great deal of time to designing and developing aviation products. Today we are manufacturing six aviation products as follows:

Spark plugs, tachometers, anemeters, thermo gauges, oil pressure gauges, air cleaner-filters, air filters, air speed indicators, gasoline flowmeters and fuel pumps. As time goes on we are confident that aircraft will play an ever increasingly important part in the manufacturing activities of our company.

B. H. CURTICE

Gen. President and Assistant General Manager

E. S. Twining & Co.

THE COMPLETE LINE of "Phiglon" manufactured by our company, packed sizes, and issued in referring tapes in all sizes, and an "aircraft" manufactured from Phiglon Fabrics and similar to the one which Commander Richard E. Byrd took to the South Pole, are being featured in our display at the Detroit Show this week. John H. Twining and V. Blinn, Jr. are in charge of the exhibit.



Aqua Oil Service, Inc.

IN VIEW OF THE FACT that Aqua Oil Service, Inc., manufacturers field fluid fueling pits, some operators have pronounced the idea that the Aqua Systems is just another fueling system. Furthermore, there has been some also that the company is chiefly concerned in painting over its pit box.

As a matter of fact, the Aqua System, known technically as the Aqua Non-Hazardous Hydraulic Potability System, is fundamentally the underground storage system. The basic system includes storage tanks and piping to various outlets. Whether the actual process of fueling planes is direct from pit box, panel or by portable tank it is necessary to have large storage capacity preferably underground.

To dispense gasoline from an underground storage tank, there are two methods, namely, suction pump and Aqua Hydraulic Potability Principle. As it is common knowledge that with the suction pump method a suction pipe with foot valve is lowered to a point near the bottom of the tank, then method will not be described in this article.

The Hydraulic Potability Principle may be unfamiliar to some operators but it is the method of fueling gasoline that has been used by a number of automobile manufacturers, automobile service headquarters and gasoline filling stations for many years. For laboratory and special test applications it has proved most useful.

The Aqua Hydraulic Potability System is a power operated system that will supply gasoline from one tank to any number of dispensing outlets and any speed of flow may be obtained. Fuel leaves the top of the tank—

consequently the best gasoline on storage is always being delivered for service. There is no evaporation loss even when the most volatile liquids remain in storage for a long period of time. As there is no evaporation at fuel storage there are no fumes in the storage tanks, the storage tank can never explode and, of course, there is no discharge of hazardous fumes when storage tank is being filled from tank wagon or tank cars.

With blended fuels, which have been increasing in popularity for some time, consideration must be given to stratification. If fuel is storage stratified and service pipe is at the bottom of the tank, the heaviest and lowest grade fuel is continually delivered. As a result, not only is the benefit of blending lost but very often a fiercer gasoline is lower grade of fuel than would be obtained from a straight refined high test product.

With an Aqua System stratification is reduced to an absolute minimum and probably prevented entirely due to the fact that the tank is "solid storage" with fluid under slight head. Many Aqua System tanks are equipped with Marubishi header and it is a very simple operation to actually bleed fuel in storage without removing it from the tank and without having it in contact with air.

The Aqua System operates with the most reliable source of power. Its cost of operation is low, there is practically no cost of maintenance, storage tanks cannot be flamed out of the ground by surface water and accurate check of all fuel in storage and handled over a long period of time may be maintained.

Our exhibit at Detroit includes airport and throng field fueling systems, gasoline and oil tanks, field fluid fuel pits for gasoline, field fluid pits for oil, air and fuel, fuel house control equipment for centralization operation and records, engine test fuel supply equipment, automatic control for constant head, gasoline meter panel for wall panel mounting, professional test meter, and gasoline and oil pump.

Carlton Maw

Packard Electric Company

NOTWITHSTANDING THE THUNDEROUS PUBLIC INTEREST in things aeronautical and in spite of the record-breaking attendance at all of the principal aviation shows lately, I do not believe that even we, who like to believe we are more or less in and of this particular industry, fully appreciate the value of aircraft shows.

That they are of value, no one seems to doubt. The question is, how valuable and in what ways?

Most of us quite naturally look at a question of this kind with a selfish background. We want to know what we individually get out of a show in the shape of new contacts, actual orders, trade prestige, etc. This is entirely correct. We have to measure the expense of time, energy and money and compare it with the value returned to us in our own individual business.

But in doing this, we must take a broad general attitude. For the plane manufacturer, undoubtedly the best means of finding customer interest is in personal contact, product and personality, except for personal demonstrations, the most efficient method available. It has been successfully used in the automobile business for years and while the nature, character and results of the

AVIATION
April 8, 1935

AVIATION
April 8, 1935

National Automobile Show has probably changed markedly from the early days, yet we still continue to hold them and the interest and attention goes higher as the years go on.

But how about the parts and accessory manufacturers. These of us who are interested in seeing the associate and engineering personnel of the plane manufacturers—our customers? Do we get much interest?

If we attempt to discuss our products with an engine manufacturer, we find he has interested in his own sales problems. The fact that he is at the show indicates that he is seeking further contact with his own customers. The interest will come to him, but he must in turn go to his customers. We find him wandering just while new contacts he can form and how he can interest his former relationships.

From the standpoint of actual sales, therefore, the show from a parts standpoint is somewhat of a total loss. This does not mean, however, in my opinion that we do not get our full support to aviation shows. In fact, I believe that they are in themselves quite important in our particular scheme of things.

At the Aircraft Shows, we learn all of the gossip and rumors which when properly used form the basis of a more complete understanding of just what is going on. We get a clear-up view of what is going on in the very rapidly changing industry. We learn who have the most appealing models and who are forging ahead most rapidly. We make certain contacts, which, when followed up aggressively, actually lead to business.

By all means, I think that every manufacturer whose products lend themselves to aviation application, should spend an exhibit at all of the national aircraft shows—that has been and will continue to be our policy!

Arma Macgregor

Sales Manager

The National Glider Association, Inc.

THE NATIONAL GLIDER ASSOCIATION, of which I have the honor to be president, is engaged in a continuous effort to introduce outdoor flying to the young men and women of the United States.

The National Glider Association, Inc., is making every effort to attract Americans, young and old, in a wholesome which is at once a clean, profitable and fascinating sport; an efficient method of training future airplane pilots; and safety in increasing numbers and a means of developing and testing new aircraft designs.

The National Glider Association is affiliated with the National Aeronautics Association, and has the hearty support of that organization. We have authority to license third and second-class glider pilots and to supervise the licensing of first-class glider pilots in the name of the N.A.A.

We are not attempting to reach the movement more ready than general knowledge of the subject profiles. We have associated with us in the National Glider Association, some of the outstanding leaders of American aviation. At the head of our Technical Committee, is Dr. Wolfgang Klemperer of the Goodyear-Zeppelin Company, of Akron, Ohio, himself the first instructor

to receive a license as a glider pilot in Germany. Associated with him on the very important committee, are the heads of the Aeronautical Departments of the New York University, University of Michigan and the University of Detroit, Professors Klemperer, Pawlowski and Altman, and also on the Committee is that veteran American pilot, Edward W. Stinson, and the distinguished aeronautical engineers, Alfred V. Yerville and Capt. L. M. Washburn. Other members of the Board of Directors and Committees are of equal standing in aeronautical circles, which is a guarantee that we will progress along safe and sure lines in the development of this fascinating sport in this country.

Miss Amelia Earhart, Maj. Harold G. Leland, Dr. Klemperer, Prof. Altman, Earl Osborn and William J. Sengge of our Board of Directors, have all actively participated in single gliding during the last few months. They are witnesses in their judgment that even the simplest forms of gliding is a thrilling and entertaining sport. What then may we expect when our pilots are able to get into advanced courses and stay in the air for hours at a time, as did Peter Headshank, German expert, on Cape Cod last summer?

It might be well at this time to call the attention of those who may read this statement, that our greatest pilots get their first experience in gliding at the camps, learn rapidly moving forward to the more advanced stages of the sport. Therefore it is necessary for all beginners to follow the same method of training.

All persons interested in gliding are invited to attend the National Glider Conference in Detroit during the All-American Aircraft Show, on Wednesday, April 10. In the afternoon the conference has been invited to join the session of the Aeronautical Section of the Society of Automotive Engineers, and at that time we will host a lecture covering both the popular and technical phases of the sport from Dr. Klemperer, the outstanding authority on the subject in this country. Maj. Earl Osborn and Major Leland will briefly outline the thrill which they received in gliding during the last few months. The interest shown by those attending the conference will largely guide the Board of Directors in the preparation of plans for the future of 1935. If you wish to see a more ambitious program carried through you should attend the conference and present your views. Everyone is welcome regardless of whether or not they are members of the N.G.A.

Ed Stinson

President

Johnson Airplane Supply Co.

PRODUCE NO MORE PRIMITIVE DEVICE EVENTS in airplane design than the tail sled. Perhaps no other item of the airplane is responsible for as much trouble and maintenance difficulties as a tail sled.

The advent of wheel brakes affords an opportunity to eliminate the sliding runway and anchor sled for the effect, rolling and more modern wheel, for, in the period before main wheel brakes the sled served as a brake.

The use of a tail wheel comes next and next an airport cart as well as on the airplane structure itself, it elimi-



Left: The "Cardinal" monoplane powered with a LeBlond engine

Right: An American Stern Mark III powered Great Lakes training plane



Left: A Whitehead engine Lockheed "Vega"



Below: A Menasco powered Alexander Eaglevark

Above: A Waco 10 powered with a Conquest engine



sales the costly and time saving replacement of tail-disk shoes—for a revolving wheel will not have a friction of the wear as on a fixed "shoe"; it permits maintenance in taking off and landing; it enables parking of the plane with minimum effort, and no dolly or special equipment.

But—do obtain the full benefits of a tail wheel it is chiefly essential to remember that the wheel itself must be suitable and the suspension must be correctly made. We recommend the pneumatic wheel for its quiet and satisfactory performance; tests on solid wheels have proved them noisy and uncomfortable to crew and passengers.

We learned in our own tests that the plane bearing could not stand up to those solid wheels whose use results in high speeds of revolution. Ball or roller bearings were more practical, and in our efforts to reduce maintenance difficulties, standard (not special) Timken bearings were used, as they carry side load as well as radial load, and are adjustable.

While the installation of a tail wheel involves no particular difficulties, it is well to arrange for restricted movement in landing, but 360 deg. movement for parking, and also to have the cause of reaction normal to the ground line.

One will note an increasing number of planes of new design using a tail wheel, and we believe it is only a short while before the airplane not equipped with a tail wheel will be considered old-fashioned.

Charles D. Dwyer
Vice-President and Chief Engineer

Curtiss Flying Service, Inc.

THE PROBLEMS INVOLVED in merchandising airplanes or airplane engines are the same; namely, product, market, merchandising organization and selection of the most advantageous means of supplying information regarding the product to the potential purchaser.

To attain national distribution of the airplanes handled the Curtiss Flying Service has evolved, and is continuing to refine, a sales structure that consists first of either distributors or local Curtiss Flying Service organizations (best described as factory branches). These are primarily wholesalers, and their function is to sell round themselves with an active dealer or retail organization. The latter must carry the burden of sales to the ultimate consumer.

The means used to convey information regarding the various products to the purchaser are advertising, brochures and demonstrations. In the present stage of airplane merchandising the emphasis is sold largely on personal knowledge and confidence. Hence actual demonstrations are of greater importance. Therefore the Curtiss Flying Service keeps sales representatives constantly in the field who cover their assigned territory by airplane—often with dealer—or listed, visiting dealers in closing sales by actual demonstrations. Next less to say this method is expensive but effective.

In the engine field our direct market consists of the airplane manufacturers. Our indirect market, to which our advertising and demonstration appeals, is the air-

craft consumer. To a lesser extent demonstration plays a part in selling engines, but more important is the engineering background and reputation of the manufacturer.

Lastly and of the greatest importance in both engine and airplane sales is the question of service. This is one of the underlying thoughts in the establishment of some 25 or 30 Curtiss Flying Service airports throughout the United States, where factory-trained personnel will be available to give service at standardized rates.

J. D. Logan

In Charge of Engine and Plane Sales

Fairchild Airplane Mfg. Corp.

YES, YES IN THE PRESENT DAY AIRPLANE DEALERS HAVE made out money selling planes. There are several reasons for this.

First. The dealer holding even two airplanes has not had sufficient variety in his line to give him the proper selling latitude. Second. Few manufacturers have given sufficient thought to the dealer's requirements from the sales angle. Third. The airplane manufacturer has given little or no assistance to the dealer to help him become thoroughly cognizant. This is vitally essential. Fourth. The expenses of the dealer's operation are unjustly heavy. Such areas as maintenance have not received the co-operative attention of both manufacturer and dealer to the end of reducing this excessive overhead. Fifth. Few manufacturers have given the development of commercial markets the serious thought it should receive. They have been content to supply operator and transport line demands. Where the manufacturer and the dealer is realize that every plane sold to a commercial house is a nucleus of efficient operation opens a new avenue of outlet, the commercial demand for planes would be increased with greater rapidity. Were the manufacturer to assist the dealer in sales propaganda and stimulate the dealer to select commercial business, it would be of great value to the industry.

In analyzing the marketing of planes we find that they are divided into four distinct groups.

Considering the number of students today and the rapid development of school activity it is inevitable that a good training plane, designed to meet all the requirements of the Department of Commerce, must be made. The sales of this plane for the coming year will not only bring the breed and better to the dealer, but the sugar as well.

The second popular line will cover that rest designed primarily for the commercial home flying, traveling problem for no motorist and sales organization. The average monthly executive spends between 2,000 and 2,500 hr. a year in travel. With a plane designed to have three times radial speed, low cost of maintenance and flying qualities permitting landing in moderate sized fields, the commercial use of planes will expand every day. The development in the sales of this type of plane will be commensurate with the sales effort and effort of airplane dealers. There is no visible limit to the extent to which this field can be developed.

The third classification covers the demand for the transport line for the larger plane to meet their requirements. This type of plane may be from 5 to 14-place,

Newark Plans Aero Exposition

*Scheduled for May 23-June 1,
Schlee Beach Farm First Entry*

Launch Outdoor Plane Advertising

Announce Changes In New Ryan Beersham

Cosma Firm Plans Increased Production

Standards for Computers

New Service for Merchants

Master Representa Cartica

Reports 64. Maths Ordered

AVIATION
April 1, 1959

Twenty Travel Aids
Ordered by Robertson

Report Plate Improvements

Claims Received for Patrices

White Concern Seeks Danville Factory Site

Adopt "I" Struts For Newest Laird

Members Made of Nine Layer Hankelite Pleased

Local News and Media

Plan Bureau of Standards Club

Religion: None Cotes: F/M Build:

Same Naturalness Distribution

Producing "Levelmaster"®

Showing the E.S.V. convertible is new plane which the Gates Aircraft Corporation will manufacture in America under license agreement with Stamps and Vooren, Belgium.

FOREIGN ACTIVITIES

Scania Will Open Service to Cristobal

BARANAGUILLA (Continued)—After two years of planning and delay, the official delay by American authorities Scania is about ready to launch its service between Colombia and the Panama Canal Zone. One of the oldest and most successful independent air transportation companies in the world, it was one of the first to use the advantages of an intercontinental air route through the Canal Zone and the West Indies. On account of official setbacks in America, it was prevented from establishing the very service which Pan American Airways has recently launched between Miami, Panama, and Cristobal.

A Scania service plane recently flew the 480 miles from here to Cristobal in less than 10 hours, making the first landing by a foreign plane in the Canal Zone following the Cordillera pact in February opening the land to American and foreign airlines on equal terms. The regular service to the Canal Zone is to be started within two weeks, and Scania will dispatch planes of 1,200 hp and capable of carrying nine passengers.

According to present plans the plane will fly along the Canal Zone to San Juan, Colombia, where west bound traffic will be delivered to planes going to Europe, Ecuador, and the Pacific Ocean. The east bound traffic will continue to Barranquilla. The company is negotiating landing rights at the capital and this city, and from here to Buenaventura, Cartagena and Paita, Peru, via Guayaquil, Ecuador.

Southern Cross Seeks Record

SYDNEY (AUSTRALIA)—On the day this magazine is due to appear, a 48-hour race is scheduled, the Southern Cross. An ex-convict Fokker will be well on its way to England in an attempt to complete the light flight in less than the record time of 55 days, made by Bert Hinkley, flying alone in a light plane, Capt. Charles Kingsford-Smith and Charles F. O. Uhl, who were piloted at the plane on its trans-Pacific flight, are at the controls on this trip.

Spain Has New Air School

MADRID (APR 4)—A new aeronautical training school offering theoretical and practical courses on aviation engines, aerodynamics, construction of airplanes and all phases of aerial construction, navigation and inspection has been launched here. Students will pay \$245 per course. Foreign students are admitted on limited numbers.

Plan Chutes for Airships

LONDON (APRIL 4)—Parachute will be used on the Z 100 and Z-61, the new English airships under construction. The regular flying rig now used in the Z A F will be adapted. The danger of fire is not considered great as there are no electric wires over the hydrogen, the only serious danger being from the heavy tanks of petrol. All metal on the airships has been heavily coated and then treated with lacquer to prevent corrosion. These coatings, it is said, could be examined in three days, inflated or deflated.

Foreign News Briefs

English air transport companies are opposing efforts of the Soviet Western, London and North Eastern, British and Scottish and Southern railroads to enter the air transportation field. It is feared that the railroads will cut in on the business of existing air lines in an order manner.

The R. A. F. now operates five squadrons of aircraft in Iraq and one squadron in Palestine and Transjordan.

Photos on Japanese Airways service are expected to show a record of at least 1000 flying hours in a wide variety of types of aircraft, including cross-country and night flying, power a cross-country, endurance, altitude and a close R. A. F. plane, permitting him to carry passengers. Experiments with multi-engine type planes and possible engineering is planned.

The two Tiger Moth high speed planes may be seen again in action in the next few days. One fitted with an engine down. It has been suggested that they be flown in speed trials during the following Cup event.

The Royal Mail steam Pacific race plane will have a large vessel available for a weekend cruise in the Solent during the September Cup races in September.

Temporary air mail service between Halifax and St. John, Canada, has proved to be a success and a permanent service will be started as soon as proper landing fields have been arranged at the two cities.

Capt. Ignacio Juvenete and Capt. Francisco Juvenete on March 28 reached the de Juncos. They are reported planning to fly to New York to inspect models of aircraft for the Spanish army.

The Graf Zeppelin completed its Star Route flight at 30 a.m., March 26, having covered 5,040 miles in 84½ hours. The ship carried 29 passengers and a crew

Government Reports European Air Traffic

WASHINGTON (AP 4)—The Department of Commerce recently issued the following figures for European air traffic for last year and 1947 with the explanation that in most cases they show traffic by stages and that such percentage of increase as shown in those instances is calculated for every stage of the flight.

	Miles flown	Passenger traffic	Mail carried	Regist. and licensed aircraft
1946	381,000	2,225	12,229	24,143
1947	341,000	2,426	13,111	14,111
1948	341,000	2,426	13,111	14,111
1949	341,000	2,426	13,111	14,111
1950	341,000	2,426	13,111	14,111
1951	341,000	2,426	13,111	14,111
1952	341,000	2,426	13,111	14,111
1953	341,000	2,426	13,111	14,111
1954	341,000	2,426	13,111	14,111
1955	341,000	2,426	13,111	14,111
1956	341,000	2,426	13,111	14,111
1957	341,000	2,426	13,111	14,111
1958	341,000	2,426	13,111	14,111
1959	341,000	2,426	13,111	14,111
1960	341,000	2,426	13,111	14,111
1961	341,000	2,426	13,111	14,111
1962	341,000	2,426	13,111	14,111
1963	341,000	2,426	13,111	14,111
1964	341,000	2,426	13,111	14,111
1965	341,000	2,426	13,111	14,111
1966	341,000	2,426	13,111	14,111
1967	341,000	2,426	13,111	14,111
1968	341,000	2,426	13,111	14,111
1969	341,000	2,426	13,111	14,111
1970	341,000	2,426	13,111	14,111
1971	341,000	2,426	13,111	14,111
1972	341,000	2,426	13,111	14,111
1973	341,000	2,426	13,111	14,111
1974	341,000	2,426	13,111	14,111
1975	341,000	2,426	13,111	14,111
1976	341,000	2,426	13,111	14,111
1977	341,000	2,426	13,111	14,111
1978	341,000	2,426	13,111	14,111
1979	341,000	2,426	13,111	14,111
1980	341,000	2,426	13,111	14,111
1981	341,000	2,426	13,111	14,111
1982	341,000	2,426	13,111	14,111
1983	341,000	2,426	13,111	14,111
1984	341,000	2,426	13,111	14,111
1985	341,000	2,426	13,111	14,111
1986	341,000	2,426	13,111	14,111
1987	341,000	2,426	13,111	14,111
1988	341,000	2,426	13,111	14,111
1989	341,000	2,426	13,111	14,111
1990	341,000	2,426	13,111	14,111
1991	341,000	2,426	13,111	14,111
1992	341,000	2,426	13,111	14,111
1993	341,000	2,426	13,111	14,111
1994	341,000	2,426	13,111	14,111
1995	341,000	2,426	13,111	14,111
1996	341,000	2,426	13,111	14,111
1997	341,000	2,426	13,111	14,111
1998	341,000	2,426	13,111	14,111
1999	341,000	2,426	13,111	14,111
2000	341,000	2,426	13,111	14,111

of 41. Speed of faster than 100 mph was recorded at one point of the trip. It is thought that every part of new line was covered at a minimum, it is reported. A second Mediterranean cruise will start April 12.

Co-operation between the Belgians and the Dutch is required to be effectively speeded up express transportation in that country.

Regency's Special Cup Race was a new endurance race started at the Cabinet, Singapore Station, South-eastern, England. The race has been held in the high speed flight of the R. A. F.

A new design airplane wing used to be built in heavy air industry type built by the British Air Ministry weighing but 250 lb. The wing is the same size and strength as a wing of ordinary construction weighing 610 lb., it is reported.

Japan's new international airport at Osaka is being developed rapidly according to the Department of Commerce. This will be one of the airports on the new Japanese route with Osaka, Korea, which the Japan Air Transportation Company is scheduled to launch this week.

THE BUYER'S LOG BOOK



Folmer Graflex Cameras

SO GREAT has the demand for aerial photography become that aviation everywhere has been busy, new source of revenue from their flying, by the use of aerial cameras. Several types of cameras for this purpose are made by the Folmer Graflex Corporation, Rochester, N. Y.

When using one of these cameras there is no guessing at the size of aperture to allow for the loss at the distance, as in the case of ground cameras, as a universal focus is used.

Folmer Graflex Aerial Camera Model K-5 is the type for mounting work in vertical positions as well as oblique. It takes 350 exposures before re-loading and, weighing 37 or 47 lb. according to the size cone and lens used, is attached to the plane by a suspension mast.

For vertical pictures exposures are made through an opening out on the floor of the plane. The mount is clamped to cross-bars in the fuselage. The viewfinder of the mount has a universal movement which together with spirit level on top of the camera, enables the operator to keep the camera exactly level at the instant of exposure. Vibration is eliminated by means of sponge rubber cushions.

For oblique pictures, Folmer Graflex aerial camera Model K-5 can be attached to either side of the cockpit, permitting the camera to be turned readily in the desired direction.

A single operation—winding a crank a few turns—draws the film over exact position and sets the shutter. A slight pressure on the release takes the picture.

The size of negative of the Model K-5 is 18x24 in. (7x9 in.). The size of camera with 12-in. cone is 29x19x19 in. The size with 30 in. cone is 29x19x19 in.



The Model K-5 Folmer Graflex aerial camera which has a weight loaded at 320 lb.

348 in. The lens is 12 in. or 20 in. Kodak Ansachromat 4.5. Shutter speeds are 1/60 to 1/200 sec. The construction is aluminum throughout light in weight, with few moving parts subjected to wear.

The Model A-1 is a light-weight, compact camera especially designed for aerial photography at lowest expense. With loaded plate negative it weighs only 15½ lb., and is held steady in the hands by means of two side grips—instead of by a suspension mast. Prints for 12 exposures of the same number and size film, can be used. The shutter release is so located that no change of grip

is necessary for taking the picture. A single, simple motion shifts the next plate in film into position. The 10 in. Kodak Ansachromat lens has a fixed aperture at f4.5 and is accurately set at proper focus before leaving the factory. The shutter is of the front-plane type, permitting the lens to work at full efficiency during whole period of exposure, a consideration of importance in aerial photography because of the short exposures necessarily necessary. Speeds are from 1/120 to 1/430 sec. Direct vision, bracket finder with zoom lens, provides lighting.

Pyle-National Products

AMONG the new products of the Pyle-National Co., 1334 North Center Ave., Chicago, Ill., are a field boundary light fixture, underground-drift construction boxes and bracket holders for the construction boxes.

The boundary light fixture consists of three main parts, a cone, reflector and the light. The cone, shape and color of the fixture make it stand out clearly during the day and the method of manufacturing the illumination on the cone by means of the reflector assures its clear visibility at night. The reflector also prevents the direct light of the fixture from producing glare.

The fixture is a standard vapor-proof fitting with globe of any specified color and designed for mounting on a standard rod.

The cone, which is 30 in. in diameter and 24 in. high, is constructed of No. 34 galvanized sheet steel to Department of Commerce specifications. It is furnished complete with top and bottom flanges for attachment to the one-inch aluminum fixture rod. A 14 in. diameter copper-thermoset plated rod furnishes the direct light on the cone.

Underground cable connection boxes are used with underground airport lighting circuits to receive protective cable connections and act as bases on which lighting fixtures can be mounted. They are regularly furnished in galvanized steel, but also can be furnished in cast iron or aluminum.

The UBK is a complete underground type box designed to split in two parts to permit the roadway cable to be connected through without cutting. When connections are completed the box is filled with sealing compound through a plug hole on top. The UBK is a dash mounting type box provided with a cover in which the fixture is attached. Roadway cable is brought in at the ends of the box through strain relief bushings, eliminating the use of sealing compound. Quick and easy extension to connections in the box is obtained through the top cover. With this type of box defective lighting fixtures can be quickly replaced. Various sizes of strain relief bushings are furnished for use with the different sizes of UBK boxes.



Boundary light fixture

U. S. Grease Gun

THE United States Air Corporation Co. of Cleveland, Ohio, has developed a portable high pressure grease gun for the rapid lubrication of landing gear, tail skid, and control column assemblies of airplanes. This equipment is known as the U. S. Electrically Driven Grease Gun. This unit operates from any electric light line and is fully self-contained, lighter, grease-buster pump and air compressor being completely mounted on an easy-running three-wheeled truck.



Illustration of U. S. Grease Gun

both hands to free the bearing. The gun is known under Alenite Patent and is equipped with both Alenite and Zeak adapters. It is especially suitable for operation at airports subjected to extremely cold weather as the built-in air compressor develops sufficient heat to keep the grease moving through the booster pump at just the right working temperature.

Spalding Equipment

A. G. SPALDING & BROS., pioneers in the development of aviation equipment, have developed several interesting new additions to their line.

One of these is a new suit which consists of a leather shell, an inside lining of fleece for warmth, and an outer thin inner shell of leather. This inner shell of leather makes the suit easy to put on or take off as it does not catch on buttons or buckles on clothing, as has been the case with the type of suit that has the fleece lining next to the wearer. Another Spalding feature is a new guarded glove with very short fingers. Spalding is now featuring a complete line of equipment for women flyers, every piece styled to attract a woman's fancy.

Hisey-Wolf Exhauster

AMONG the recent additions to the line of the Hisey-Wolf Machine Co., Cincinnati, Ohio, is a belt driven, motor-driven unit of exhauster equipment for use with Hisey grinders or 10, 12 and 14-in. wheel capacity. This equipment is also intended for use with the 8, 10, 12 and 14-in. wheel buffing and polishing machines, also manufactured by the company. The automatic motor starter controls both exhauster and grinding wheel driving mechanisms simultaneously.



SIDE SLIPS

By Robert R. Osborn

"Preparations for the inauguration of the International Congress of Senitary Aviation, the first of its kind, are going on today, according to the Journal of the American Medical Association. * * * The following questions will be raised: Senitary aviation in the outlying districts, senitary aviation in the colonies, senitary aviation in the navy, senitary aviation in war time, senitary aviation in peace and senitary aviation boats."—*New York Times*.

We certainly hope it wasn't anything we read in this space that brought about this investigation, as we have always tried to keep in mind the fact that we were working for a fine spreading family magazine.

Possibly the International Congress of Senitary Aviation would like to have us deliver a paper on our favorite subject, "The electric stove as a senitary appliance?"

On his recent solo endurance record flight Merlin Jensen sent the following down as a note dropped to the field: "This morning I had the first coffee I have taken. I'm sure used but it hurts where I sit." This should be a tip to airplane designers to make special places from which endurance aviators can take their meals.

El J J sends in some newspaper notes from the Connecticut, Mass. Times in which a speaker is quoted as saying, "Lindbergh's spent hours of study over his charts, the meteorological reports, mechanics and style of a plane and endeavored to figure out the air currents and hazards of freezing weather as route. He had the foundation, set his propeller in the direction of them and then, only then there with no apparent trouble."

El J J says he is sure it won't be as easy as this speaker makes it out to be,—just setting his propeller in the direction of them, as he has seen some fellows set the propellers of their ships in an upward direction and the planes came down.

Mr. R. D. S. of St. Paul, Minn., sends us an statement in the second job in a recent statement issued to the press by the president of an air line operating company. His statement is in effect that his line had carried thousands of passengers and no ship had been damaged even to the extent of having a tail clip. R. D. S. explains that this great record for safety might not be so startling as it sounds when one considers that all of the line's ships are equipped with tail wheels.

"He brought the plane safely to earth and landed for thirty years on one wheel with the axle of the missing wheel dragging the ground.—From an item sent us by E. M. of Peterson, N. J.

This must have been the same chap we were reading about some time ago whose plane "flew along the ground for a thousand years before it was able to take off."



THE VALENTINE AERONAUTICAL DEPARTMENT will speed your production

Builders of aircraft—Attention!

Valentine & Company introduce a new department, dedicated to the service of solving aeronautical finishing problems.

Skilled, highly trained technical men will be glad to go into your factory and show you how to effect real time and labor economies, as well as to demonstrate a finish of unsurpassed beauty and unbelievable durability—Alaplane Nitro-Valquer.

This remarkable finishing system is as modern as aviation itself. But it is no fledgling. It has won its wings.

Alaplane Nitro-Valquer answers the ever increasing demand for color and extreme durability. At the same time it solves the problem confronting manufacturers who find essential a finishing process which insures speed production.

VALENTINE & COMPANY
AERONAUTICAL DEPARTMENT
186 Fourth Avenue
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BOSTON: 45 Purchase Street

DETROIT: 80-564 General Motors Bldg.

Visit our booth at the Bureau International Exposition for conclusive proof of the superior quality of our modern airplane finish.



**A NEW
CABIN PLANE OF
UNIQUE DESIGN**

Mohawk presents a smart, new, two-place cabin plane—unusually sleek in appearance and remarkably efficient in performance, combining all the distinct advantages offered by the low-wing type monoplane.

This, and other types of Mohawk planes, will be exhibited at the All-American Aircraft Show, Detroit, April 6th to 14th. Write for descriptions and specifications.

**Mohawk Aircraft
CORPORATION**
2019 DeWitt St. S. E.
Marietta, Minn., U. S. A.

THANK YOU for mentioning AVIATION



SAFEST - SWIFTEST - LARGEST

KEYSTONE PATRICIAN

The AIR LINER for the NEW DAY in air transportation

THE Keystone PATRICIAN was built to meet the urgent need of the larger transport lines for planes of vastly greater speed, increased cargo capacity, quicker take-off and satisfactory performance at high altitudes.

That the PATRICIAN meets all of these needs has been strikingly demonstrated on its record-breaking tour, now nearing completion. In a flight of many thousands of miles, twice spanning the country from coast to coast, numerous cities have been visited—scores of pilots have been given the opportunity to fly this great ship and have marvelled at the ease with which it handles—transportation executives everywhere have witnessed its swift flight, its unequalled capacity for

EXPERIENCE	RECORDS	SAFETY	SWIFTNESS	COMFORT
10 years	100,000 miles	100,000 miles	100,000 miles	100,000 miles

passengers and freight, in their guided appointments for luxury and convenience.

To established air lines, the PATRICIAN will bring increased business, improved schedules, greater profit. Moreover, this newest and greatest giant of the air carries with it all the assurance of reliable performance that specialized experience in building multi-engine planes, meticulous care in manufacture, high engineering skill and great resources alone make possible.

KEYSTONE AIRCRAFT CORPORATION

July Day—1st Street and East River, New York

Place—Boston, Peoria, and New York City

Exclusive Representatives: W. B. Thomas, 107 Madison Street, Chicago



KEYSTONE

"THE NEWEST K OF SAFE FLYING"

Below—Entrance to the Patrician
Right—Front view of the Patrician showing its fast wing spread

Below—Exterior view of the Patrician, equipped with emergency landing gear and air light

THANK YOU for mentioning AVIATION

Canada To Cuba!

*without
stop*

a great flight
a perfect Test
of a great oil



BELLANCA AIRCRAFT CORPORATION

NEW CANADA BUILDING

R. C. A.

BARABO, CANA
February 22nd, 1935

GEORGE W. HALDEMAN
BELLANCA, IN.

Dear Sir,

I wired you this afternoon advising you of our landing here in Havana, Cuba, at 10:45 P. M. following the first non-stop flight from Canada to Cuba, which successfully to the first time the United States has ever been crossed without landing.

In this flight we carried ten hundred fifty six gallons of gas and fifteen gallons of your Kendall "Penzbest" oil. Before leaving Canada I certified Kendall oil because of the highly satisfactory results which I have had from using your oil in my plane for years. Upon landing here we had our oil drained and found that we still have twenty and three-quarters (22 3/4) gallons left. This means that our consumption for the entire trip and fifty five minute flight was only about 10 1/2 gallons, or considerably less than our tank was born.

Further Canada this morning in below zero weather and landing in Cuba with a thermometer which the thermometer will only show thirty (30°). In my mind in giving Kendall oil a good test. While the oil temperature varied from thirty degrees in Canada to one hundred thirty degrees in landing here, the oil pressure remained at fifty five pounds throughout the flight.

Allow me to take this means of expressing my appreciation of the highly satisfactory results which you have given you that we are using Kendall satisfactorily at our Bellanca factory.

Very sincerely,

GEORGE W. HALDEMAN



George W. Haldeman Ries from sub-zero weather to summer's heat with KENDALL PENZBEST OIL

On February 22, 1935, George W. Haldeman, with James Haldeman, test-pilot, completed the first non-stop flight (over same previously attempted by others) across the U.S. from Canada to Cuba, entering at Camp Columbia Field, Havana, at 10:45 P. M. from Windsor, Ontario, Plane: Bellanca C-2L Distance 1400 miles Time: 12 hours, 30 minutes. Total oil consumption: 24 gallons of KENDALL PENZBEST.

The start, at Windsor, was made at 3:40 A. M. in adverse temperatures. The final stage of Kendall Penzbest Oil in operation smoothly and unobtrusively the reaching to Havana at lower altitudes, even has been an invaluable ally in meeting the plane on an easy to the distant mark. Down the Florida coast and across to Cuba, Kendall Penzbest, as we proved, did not run out and low body—the oil pressure remained at 55 lbs., making a magnificent flight to a tropical beach.

The remarkably low oil consumption of 2 1/2 gallons in 12 1/2 hours of flying, is typical of Kendall Penzbest performance, ensuring economy, efficient lubrication, added power and perfect protection to the motor.

Derived from the Shellford Grade of Pennsylvania Crude, second in quality to the world, refined without ash, Kendall Penzbest is made available to aviation as the best oil for every use and for every season of the year.

For a list of airports where Kendall Penzbest is now available, also an extensive description, Kendall Refining Co., Bradford, Pa.

KEYSTONE-LOEING AMPHIBIAN "AIR YACHT"



Powered by the 525 H.P. Wright "Cyclone", the 1935 model Keystone-Loeing Amphibian "Air Yacht" is winning new laurels in the services of transport lines and individual owners. The great background of this development with its thoroughly proven design, tested in millions of miles of service flying, have created a constantly increasing demand for "the plane that does the hard work for America". Yet, due to the large plant facilities and great resources of the combined Keystone and Loeing organizations, prompt deliveries are being made.



KEYSTONE AIRCRAFT CORPORATION • SALES DEPT.—31ST ST. AND EAST RIVER NEW YORK PLANTS—BOSTON, MINN. AND NEW YORK CITY

KENDALL PENZBEST MOTOR OIL

REFINED FROM 100% CRACKED
GRADE OF PENNSYLVANIA CRUDE

THANK YOU for advertising in AVIATION



FLYING INSTRUCTION Conducted under a new plan

THE Flo School of Flying is planned and operated for those who demand the finest type of flying instruction. Personnel, equipment and facilities all measure up to the high standards, so that every student graduated by our organization is an excellently trained pilot. The Flo School of Flying has a successful record and is highly endorsed by leading Detroit business men who have taken the course, and army air corps officials.

Personnel

The president of the Flo Flying Services Inc., Leonard S. Flo, is the chief instructor of the Flo School of Flying. Nationally known as a pilot, a graduate of the Army Transport School at Brooks and Kelly Fields with a year of service with the First Pursuit Group at Selfridge Field and extensive small and commercial flying experience, he is admirably fitted from the standpoint of practical knowledge to direct the flying school activities. He is assisted by a competent staff of experienced, licensed pilots who were chosen for their dependability and training.

Equipment

New Spartan and Arrow Sport planes, powered by modern sun-

cooled, radial engines are the modified training planes. Particularly well adapted to training purposes, they offer the student open cockpit flying experience plus a maximum degree of safety. In addition, students are given time on closed types.

Facilities

Training at either of two fields is available to students of the Flo School of Flying. Wadsworth Field, conveniently located with respect to Detroit at Ford Road and Wyandotte Avenue. And the Ann Arbor Municipal Airport, Ann Arbor, Michigan, which is the main base of operations for the Flo Flying Services Inc.

See us at the Show

As distributors for the Spartan Aircraft Company and the Arrow Sport Aircraft Company, Flo Flying Services Inc. will exhibit at the All American Aircraft Show. See our representatives there and learn the advantages of the Flo plan of individual flying instruction—or write direct and we will send you our illustrated booklet describing the course of training we offer.

FLO FLYING SERVICES INC.

Conducting the FLO SCHOOL of FLYING

Ann Arbor Municipal Airport

Ann Arbor, Michigan

"Van Dorn"
ELECTRIC GLUE HEATER

This glue heater is indispensable in aircraft building and maintenance because it solves the problem of keeping glue heated to the proper working temperature.

Experience has shown that glue at 150° Fahrenheit is the best working consistency and this temperature is maintained in the Van Dorn Glue Heater by means of a thermostatic control.

The heating element is of nichrome ribbon with mica plates and is tightly sealed with asbestos to eliminate fire hazard, to prevent possibility of any liquid getting to the heating element and causing a short circuit.

This portable glue heater can be carried to any part of the job and connected to any electric light socket.

A correctly designed handle affords an easy means for carrying and the heavy iron wiper across the center of glue receptacle makes it convenient and prevents waste by drippage.

GP-100
Capacity 2 Quarts
\$27.00

The "Van Dorn" Electric Tool Co.
Cleveland, Ohio.



AVIATION is your future

**Train for the Big Jobs Now at the Largest*
Air School in the United States**

**Parks Air College has a range of 24 instructors, eleven buildings with a floor space of 40,000 square feet and a total investment of more than \$10,000,000.*

THE opening of the Detroit Air Show on April marks another milestone in the rapid ascent of aviation. Thousands upon thousands will flock to see the exhibits, will be thrilled at the sight of great mechanical planes, beautifully equipped amphibians, smart looking cabin jobs, and the trim, speedy, open cockpit planes.

Business men, industrial executives, and sons of wealth and virtue will place orders for hundreds of planes at this Show. And another era will go up for more trained pilots, more trained mechanics, more commercial courses, there to learn and manage this addition to an already seriously under-manned, urgent, young industry.



No other business offers you, as a red blooded American, such a wonderful opportunity for advancement. Aviation is growing so fast that the men who start their training now start off the responsible position in five months' time. Hundreds of pilots' and mechanics' jobs at excellent salaries are always open. All that



These photographs show a Parks Air College student in action.
America's greatest aviation school is now open.

you need to get into an alert mind, physical fitness, and learn to push yourself ahead, and the training that you will get at Parks Air College.

What More Glorious Future Could You Want?

Aviation is a young man's industry. It's full of the spirit of youth, of soaring progress, it's healthful, pleasant, and full of the spirit of competing men too. And it's profitable far beyond the dreams of the young men whose business career is just beginning.

Train at the Largest Air School in the U. S.

Parks Air College has all others, not only in excellence, but in the number of graduates, the thoroughness and systematic training of its training, and the completeness of its facilities in flying and ground equipment.

Parks Air College is the place for you to train. Here you can secure a complete aviation education. You have your choice of the Primary Flying Course, the Advanced Flying Course, the Night and Blind Flying Course, the Navigation Course in Amphibians and Engines, and our newest course in Commercial and Aerial Photography. And you are sure at Parks that you are getting the best training you can get anywhere in the United States.

A big red motor plane at Parks Airport.



Complete Pilots' Course

Two months' training at Parks Air College will fit you for a pilot's job, paying from \$300 a month up. It will give you thorough instruction in navigation, aerodynamics, airplane design, rigging, airport management, aerial photography, etc. You will get a thorough deep course in power plants—everything from the big Liberty, the Whirlwind, and Fairchild down to the little Vee engine. All equipment and planes are the latest type, and our instructors have an excellent reputation both as pilots and classroom teachers.

New Course in Photography

Parks Air College is the first school in America to offer a course in Commercial and Aerial Photography. \$4000 has been spent on equipment, and its expert instructor with twelve years of experience will be in full charge. All phases from the rudiments of commercial photography—chemistry and laboratory—to the advanced map-photography with 252 hours in Aerial Photography will be given. Graduates from this course will be qualified experts upon the best selling jobs in a new untapped field.

Come to Parks Now!

Make up your mind to join the hundreds of happy, enthusiastic students who are always training at Parks. Here

(A typical class of Parks Airport.)



at the big Parks Airport (13 miles from the heart of St. Louis), you are right in the midst of one of the most popular metropolitan flying fields. Bombardiers, ships, bombers, airplane factories, restaurant, motorboat hall, and a new dormitory hotel are right on the field. Here you will get your training in an enthusiastic, progressive environment. And here you will get that Parks training which commands respect, confidence, and guarantees you a good paying job when you graduate.

Fill in the coupon now. Get our new illustrated booklet and read the whole story of your future in aviation.

Parks Air College

204-D Missouri Theater Bldg.
ST. LOUIS, MO.



Cable Address: PARKSAIR
Member International Chamber of Commerce

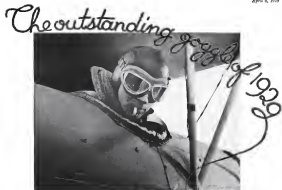
PARKS AIR COLLEGE, Inc.
204-D Missouri Theater Bldg.
St. Louis, Mo.

Send me your illustrated booklet "Show Me the Way to the Pilot's Course."

Name Age

Street

City State



the new improved

SEESALL

created by the makers of LAMBLER 'Ears for the Blind'

REFINEMENT in details of frame construction and finish, including a hinge front, make this new Seesall the most attractive as well as the most comfortable and widest vision goggle for flyers . . . Price with clear bent cylindrical ground and polished lenses \$15.00. With tinted lenses \$17.00.

SOLD by dealers everywhere—but if none convenient—send me your check for \$15.00 (or \$17.00 if tinted lenses are desired) and send me your improved Seesall by return mail. If not satisfied with your purchase you may return it and money will be cheerfully refunded.

Write for samples of goggles and flight reports.



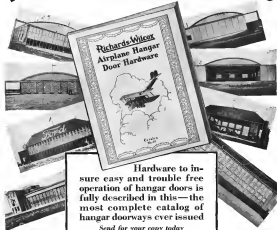
WHOLESALE orders, sent of the Becklin, filled from stock by R. Meyer & Sons, 2121 Broadway, San Francisco, Calif. In Canada: Erlson Aircraft Ltd., 45 Jarvis Street, Toronto.

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Hardware to insure easy and trouble free operation of hangar doors is fully described in this—the most complete catalog of hangar doorways ever issued

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EASTMAN Announces *The SEA ROVER*

~ ~ Three Place Flying Boat Powered
with the Curtiss Challenger



THE SEA ROVER is fully equipped with engine starter, eight instruments, navigation lights, motor and ample baggage compartment. The dual control is wheel type—only by side. Its fuel capacity permits a cruising radius of about 800 miles with a useful load of 610 pounds.

Beautifully finished and appointed, The Sea Rover makes its debut at the All-American Aircraft Show. With a top speed of approximately 110 miles per hour, the exceptional Flying Boat offers the sportsman, the commuter, or the commercial flyer who wishes to carry passengers at remote points, the utmost in air performance with low maintenance. The Dutchman's hull and the use of tension struts in place of wingtip bracing are the outstanding features of construction. . . . Due to the ingenious arrangement of these tension struts, The Sea Rover cannot become "tail-frog", and it can easily be dismantled and set up again by the experienced without danger from this source. See this latest Flying Boat at the All-American Aircraft Show, or write for further details.

A few dealer territories still open

EASTMAN AIRCRAFT CORPORATION



DETROIT, MICH.

Manufacturers of Flying Boats and Amphibians



FRANK NEW for advertising AVIATION

ANOTHER ONE OF THE 65 AIRCRAFT MANUFACTURERS
THAT USES SKF BEARINGS

Wright Aeronautical Corporation



Equipped with the highest priced bearing in the world

YOU MAY BUY A BEARING AS A FAREPART, BUT TRY AND GET A BARGAIN OUT OF USING IT



Leaders in Aviation Use SKF Because Reliability is Not Sacrificed to Price

THROUGHOUT the aviation industry there is one reason and one only why SKF Ball and Roller Bearings are first choice of the leaders, the immutable truth that...in the air certainly nothing is apt to cost so much as a bearing that cost so little! And so this huge transport plane is equipped with three Wright Whirlwind motors with SKF Bearings on the vital locations.

Much has been said and written of precision, quality, long life and dependability of anti-friction

bearings. SKF makes no broad claims to these virtues but bases its leadership in aviation on proven performance on epoch-making flights and commercial service. SKF controls the production of its bearings from the ore to the finished product. SKF does not manufacture one type of bearing. It makes many types. Therefore, SKF recommendations are—unbiased. Wright has been using them for 15 years and 64 leaders in the industry also incorporate them in their products.

SKF INDUSTRIES, INC., 40 East 34th Street, New York, N. Y.

See the
SKF EXHIBIT
at the
ALL-AMERICAN AIRCRAFT
SHOW
Detroit
April 6th to 10th

SKF

Ball and Roller Bearings

THANK SKF FOR INSURING AVIATION

PROOF

Words, ads, sales talk—these do not convince. In the final analysis, it is PERFORMANCE that clinches the sale. When Stromberg sets out to convince you of its merits, it needs no greater proof than the achievements listed below.

Stromberg Carburetors Used in Creating Every Record Shown Here

Cross Country Flight—Los Angeles to
Roosevelt Field, L. I., Frank Hawks
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Endurance Flying Record—Army plane
"Question Mark"—Maj. Carl Spatz,
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Gordon..... 1928

New York to Paris in his new famous
"Spirit of St. Louis"—Col. Chas. A.
Lindbergh..... 1927

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endurance record—Clarence Chamberlin
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All Three Winners Reliability Test—
1st, Travel Air, Walter Beech, Pilot—
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See our Exhibit
At the Detroit
Aircraft Show
April 6th - 14th

See our Exhibit
At the Detroit
Aircraft Show
April 6th - 14th

STROMBERG MOTOR DEVICES CO., 58-58 E. 25TH ST., CHICAGO, ILL.

THE ARROW SPORT



AT CHICAGO—a sensation! At New York—an order for 200 ships placed by the Eastern Arrow Aircraft Corporation! And now we have the Detroit Aircraft Show.

The Arrow Sport will be on display, powered with 60 and 90 H.P. engines.

The plane with safety and performance. It will not spin following a stall.

Distributors and dealers should make it a point to see this remarkable ship.

"Watch the Arrow Sport go straight to the Heart of America."

Arrow Aircraft and Motors Corporation



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*Latest Upholstery Fabrics
for
Modern Transportation*

WM. WIESE & CO., INC.
234 WEST 56TH STREET
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SIEMENS ENGINES

Known and used
throughout the world

80 to 125 horsepower

See the exhibit
at Detroit

K. G. Frank
Consulting Engineer
75 West Street, New York
General Representative for
Siemens & Halske A. G.



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FOR THE APPROVAL OF THE SPORTSMAN

A semi-military, sport type biplane. Every one wants to fly either for business, sport or pleasure Here is the plane to fulfill that want. A plane that creates an immediate desire for ownership on the part of all who see it.



We will exhibit this snappy sport plane at the Detroit Show. A valuable franchise on this and a training plane, open to dealers . . . Demonstrations by appointment Prices to be announced at the show.

THE **SWIFT** →

AIRCRAFT CORPORATION
WICHITA KANSAS

THANK YOU for including AVIATION



AMERICA'S FINEST AVIATION OIL "The Oil Everlasting"

How long could the "Question Mark" have stayed in the air—just as long as its motors received efficient lubrication.

GULFPRIDE OIL is absolutely the last word in Aviation Oil—it costs more and is worth more than it costs—GULFPRIDE will keep you up when all other lubricants fail.

The Universal Flyers took their Ford Tri-motored monoplane to the factory for an overhaul—it had 365 hours of actual flying—they say:—

"When taken down, the motors were found to be in unusually good condition. The bearings were perfect and required not the slightest attention. Probably one of the most important points, however, was the fact that the accumulation of sludge was almost negligible. We attribute this desirable condition to the fact that GULFPRIDE OIL was used during the whole period."

Just one trial will convert you to its use

At the Sign of the Orange Disc

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District Sales Offices
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THANK YOU for including AVIATION



No Modern Pilot's Training Is Complete Without Instruction in a Closed Cabin Plane

The present wide-spread use of the closed cabin plane and the differences in flying this type and the open cockpit model, make it necessary that the modern pilot be able to fly both types.

The Curtiss OX-5 Robin is the only OX-5 powered cabin plane combining great ease of control, extreme maneuverability, clear vision, slow landing speed, and economical fuel consumption. It is this exclusive performance that makes the Robin the ideal closed cabin training plane.

Instruction in the Robin is included in the flying training given at Curtiss Flying Schools and others whose methods are modern and whose equipment is up-to-date.

*Write for information and a copy of the booklet on our
Flying School Course*

CURTISS FLYING SERVICE, Inc.

New York Office
GARDEN CITY, LONG ISLAND
"—World's Oldest Flying Organization"



TRADE YOU for monthly AVIATION

Sole Sales Agents for
CURTISS AIRPLANE AND MOTOR CO., INC.
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THREE GREAT SIKORSKYS

*Each With Two
Powerful Engines*

Fly Over 1200 Miles of Caribbean Sea Daily With Unfailing Performance

As the twin-motored Sikorsky Amphibian can fly and climb on one engine, the safety and flying comfort of passengers and pilots is insured. Thus Pan-American Airways, operating a direct passenger line between Miami and Havana, conveys its precious Caribbean cargo 1200 miles every day with a confidence based on the knowledge that the liabilities of a forced landing is reduced to a minimum.



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CURTISS SERVICE

There Was Only One Thing the Engineers Couldn't Put Into This Fine Engine

Skilful and experienced engineers designed and built the Curtiss Challenger engine—taking all the time they needed—and using the facilities of the oldest manufacturer of engines in the country—Curtiss.

Exacting laboratory and gruelling flight tests have proved the engineers right—it is a fine engine, worthy of Curtiss traditions.

Still there is one thing the engineers could not build into it, but that Curtiss Flying Service has added—the great servicing advantages of 25 Curtiss Flying Fields. (Ten such

fields are now in active operation.) Located at strategic points throughout the country, each Field will have a fully equipped service station to render instantaneous service on the Challenger engine—in 1929.

Thus Cessna, Travel Air, Stinson, Command-Aire, Alexander, and other representative manufacturers are installing Challenger engines in their planes—for they know that it is mechanically a fine engine, and their customers know what it means to have a nation-wide chain of 25 Curtiss Service Stations always ready to give them service.

(FURTHER INFORMATION CLAIMED FURNISHED ON REQUEST)



CURTISS FLYING SERVICE, Inc.



NEW YORK OFFICE—GARDEN CITY—LONG ISLAND

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CURTISS-ROBINSON AIRPLANE MFG. CO.
TRADING POST, Inc. (aerial rig. AVIATION)



25 CURTISS FLYING FIELDS IN 1929



This means that there will be 25 fully equipped service stations giving expert mechanical service on every plane, engine or part made or sold under the Curtiss name.

It also means that there will be 25 flying schools where prospective pilots learn to fly under experienced instructors, using the most modern equipment available.

Thus is established—under the auspices of the finest and most highly organized flying service in the world—a nation-wide chain of aviation service stations, schools and centers where the public can follow the modern urge to fly.



"—World's Oldest
Flying Organization"

CURTISS FLYING SERVICE, Inc.

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Thor Electric Drills



**..there are
no better
drills made**

In buying Electric Drills what do you consider as the most important points?

Power—Speed—Ruggedness—Price? A Thor has everything you need for low cost drilling.

It has power—more than you'll probably ever use but it's there for emergency. It is speedy—a super power motor takes care of that. It's rugged—built like a battle ship from spindle end to grip handle of high grade, tested, easy running parts.

And the price of a Thor Electric Drill is low considering its performance—the

number of months and years it is on the job without requiring extensive repairs.

Thor Drills are **DESIGNED RIGHT—**and **BUILT RIGHT.** Every part that goes into a Thor is tested—every operation is supervised by experienced men—every tool is checked, not once, but three times before it leaves our factory. Nothing is left undone to assure you electric drills that will give the kind of service you have a right to expect.

If you are interested in this kind of performance—and of course you are—we suggest that you try a Thor Drill in your own shop under your own conditions. Its performance will convince you as it has many others.



INDEPENDENT PNEUMATIC TOOL CO.

PNEUMATIC
TOOLS

232 South Jefferson Street
Chicago, Illinois

ELECTRIC
TOOLS

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Aerial photograph taken in Denmark, showing IRVIN Air Chute, J.7184, in use. The chute is open and the person is standing on the wing.

Jump—

---Zip!

IT'S OPEN. Glory be—you're safe! You fall safely. You rest in and air. And then when... While Master Earth floats ever so gently up to greet you.

For is it wrong to say glide smoothly, easily groundward, during the long-peace, confidence of certain safety that IRVIN Air Chutes have had all over the world, in the minds of men who fly—and sometimes jump.

Scenes and scenes know what a life saver this is, from their own life-taking experiments in the air.

Already more than 118 aviators have been saved in life and unscathed by one of their IRVIN Air Chutes when caught in the wind, possibly have broken their necks safely down.

Among these are aviators in the Air Forces of Great Britain, Japan, Sweden,

Denmark, Poland and the Argentine Republic, as well as aviators in the United States.

A number indeed have been saved in accidental operations.

Many of the emergencies were of the most serious nature, and in every case the IRVIN Air Chute functioned perfectly.

After thorough investigation and rigid comparative tests, many governments have adopted the IRVIN Air Chute as the standard life-saving equipment for their Air Forces.

If extreme emergency—all circumstances—in a deadly crisis—suddenly confronts you on the air, will you, then, be ready to meet it with IRVIN confidence?

Do you have what this means?

Write today for illustrated prospectus. "You Safety in the Air, Every Minute."



Irving Air Chute Co., Inc.

Cable Address: "Irvin, Buffalo, New York, U. S. A."

Head Office, 372 Pearl Street,

Buffalo, N. Y., U. S. A.

THANK YOU for mentioning AVIATION

Are YOU A PILOT for PAY or PLAY..?

IS aviation your vocation, . . . or . . . avocation . . . ?

Unless you intend to make aviation your business, your source of income, your future vocation—there is little reason for you to read further. For, this advertisement is addressed primarily to men who have decided to make their livelihood "in the air"—men who believe in the present and immediate future of aviation and are willing to mix brains and perspiration in the accomplishment of their purpose.

As one visually interested in the advancement of commercial aviation, your consideration should be the determination of where and how the profits in aviation will be made. How you can best employ your time and talent to lucrative means—how you can knowledge and reasonably give the first step forward as a logical manner.

To make a profit there must be a market. Markets are people. Consequently, the men who will participate in aviation. But, the present aviation market, together with the sales of private planes are considered, is circumscribed by the number of people who can and



see by license permitted to fly. The first step, therefore, in expanding the aviation market is to reach more people to fly. All of which obviously means more and better flying schools. To this end, nothing can contribute as much to the probable success of a school as the type of training plane used—in simplicity which by design and construction will stand up under the rigorous punishment incidental to flying instruction. . . . *simply and safely*

Such a plane is the Aeromarine-Klemm—AKL25 monoplane—which, for years has been considered the standard training plane throughout Europe. Powered with the well-known Salmson four-horsepower engine, an AKL25 will "fly" both instructor and student on less than four gallons of fuel an hour. A reasonable performance, is it not? In fact, if we were to put the complete performance figures of an AKL25 in print, we would soon doubt and question as to the part of the reader. But once you witness a demonstration, your assurance is readily changed into the realization that the AKL25 is truly more than has been claimed

HOW you can make aviation Pay . . . Now . . . !

The present demand for flying instruction exceeds by far the existing aviation school facilities. For the experienced pilot, who has a knowledge of modern merchandising methods and a corresponding degree of salesmanship, the present status of the industry offers an unparalleled opportunity for him to go into business for himself. All that is required is the usual capital, a sense of service, and an aptitude for organization.



To promote the development and expansion of both training and simplified flying schools, we are prepared to assist you, not merely in supplying the flying equipment—AKL25 planes—but, in the selection of the right location for your school and in the preparation of your personnel and, in the planning of your advertising and sales promotion material.

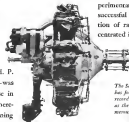


Thousands upon thousands of people are seeking the right school for flying instruction. If you have the same perspective of aviation as we have, and you are sincerely interested in starting or expanding your own school, we will gladly co-operate with you in every way possible. Write us for details.

The SALMSON AD9 Now Available for Immediate Delivery



All Salmson AD9 engines are built to a standard, and backed by an organization which placed the radial type of aircraft engine.



The Salmson AD9 engine has four years' successful record of practical service, as the power unit in numerous types of European light planes.

The Salmson AD9—40 H. P. radial air-cooled engine—was originally designed for use in light touring planes, and is therefore especially suited for training purposes. As on all radial engines built by the Societe des Moteurs Salmson, the cylinders are anchored individually to the crankcase by studs, making each cylinder as well as the connecting rods, pistons, valves, rocker arms and other parts interchangeable.

The Salmson AD9—the popular and proven engine in the light plane field—is distributed exclusively in the U. S. A. by the Aeromarine Klemm Corporation, Paramount Building, 44th Street and Broadway, New York City.



UNITED STATES DEPARTMENT OF COMMERCE APPROVED TYPE CERTIFICATE No. 121



AEROMARINE KLEMM CORPORATION

Paramount Building • 44th Street and Broadway • New York City

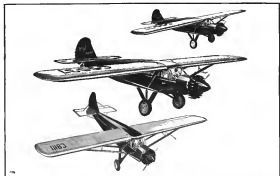
The Travel Air Monoplanes

You'll find in Travel Air Monoplanes a size and motor power best adapted for every light transport, pleasure and personal business use; each of these Monoplanes is dependable, moderately priced, of proven performance and operates at a minimum of cost.

New 4 place Cabin Monoplane, Challenger, 170 H.P.
New 4 place Cabin Monoplane, Wright J6, 225 H.P.
6 place Cabin Monoplane, Wright J5, 225 H.P.
6 place Cabin Monoplane, Wright J6, 300 H.P.
6 place Cabin Monoplane Wasp Motor
These planes are inherently stable and in themselves will automatically maintain straight and normal flight. The slightest movement of the controls corrects for any atmospheric variation. Dual control (day) and large, full visibility cabins in which all occupants face forward are outstanding features of Travel Air Monoplane construction.

Ample finance—fifth year of continuous manufacturing to exacting standards. Over 100,000 feet of floor space filled with modern machinery. Night and day operation. Catalog and story of Travel Air on request.

THE STANDARD OF AIRCRAFT COMPARISON



**TRAVEL AIR
COMPANY
WICHITA, KANSAS**

THANK YOU for mentioning AVIATION



The Center of the Air Commerce of the East

NORTH, South, and West the planes leaving the United States are with new wing their way from Newark Monoplane Airport. And where the air mail goes, there passenger traffic also goes, so that it is true for Canada, New England, the Middle West and the South now take ship at the Newark Airport.

Thus in a few months, this newest and finest of Eastern airports has assumed the dominant position in aeronautical affairs to which it was destined from its very inception by virtue of its strategic location at the gateway to the most densely populated community in the United States.

Within five minutes of the heart of Newark and twenty minutes of downtown New York, the Newark Airport occupies a "choke-point" position which no other airport in the metropolitan district shares. It is the logical beginning of the "air trail to everywhere" for residents out of New York and vicinity and the natural focal point for the Air Commerce of the Eastern United States.

Manufacturers of planes and accessories can readily grasp the practical advantage of plant location adjacent to such an outstanding center of aeronautical activity. Inquiries are invited.

**GEROME T. CONGLETON, MAYOR
NEWARK, N. J.**

NEWARK AIRPORT

THANK YOU for mentioning AVIATION

AIRPORT LIGHTING EQUIPMENT



Type DCB24

This new revolving beacon was built by Crouse-Hinds Company to meet the specifications of the United States Department of Commerce and is the government standard for use on airways.

This beacon can be furnished with a magnetic lamp changer and main lights which enable the operator to locate the beacon after he has passed over the main beam.



Type AKP24

Type AKP24 floodlight is entirely new in principle and design. It consists of a glass reflector of such design that the vertical spread is limited to a very few degrees but the horizontal spread is 150 degrees. This projector is designed particularly for lighting the landing area of an airport.

Everything in lighting equipment for airports and airways.

Everything in lighting equipment for airports and airways.



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THANK YOU for reading AVIATION

THANK YOU for reading AVIATION



DAVIS AIRCRAFT CORPORATION

RICHMOND, INDIANA • • presents this

Davis Monoplane

“THE AMERICAN MOTH”

A 2-Place High-Wing Monoplane
built for

*Student Training and
The Private Owner*

Exceptional Stability and Sturdiness
with Performance and Maneuverability
Rarely Found in a Light Plane

• • • Many desirable territories are still open on the Davis Monoplane. Responsible dealers are invited to write for complete details of the Davis franchise.

\$2965, f. a. f.

Complete with LeBlond
60 H. P. Radial Engine
Flies any field

THANK YOU for reading AVIATION



After all
it takes a flight to convince you

IN previous advertisements we've been telling you a lot about the mechanical features of the COMMAND-AIRE plane.

But now we want you to try one—either as pilot or passenger—and are going to make it easy and convenient for you to do so. For after all, it takes a flight to convince anyone as to the performance—including stability—of a plane.

Thus we give you below the names

of COMMAND-AIRE distributors in various sections of the country. We know that any one of them will be glad to demonstrate the COMMAND-AIRE performance to you.

Whether you are interested in handling COMMAND-AIRE planes, or merely interested in flying one, we are happy to make it easier for you to test the positive stability of the COMMAND-AIRE where it should be tested—in the air.

Just call on the nearest distributor.

COMMAND-AIRE, INC., Little Rock, Arkansas



COMMAND-AIRE



INDIANAPOLIS, INDIANA
Stearns Flying Service Corp.
302 South Delaware Street

CHICAGO, ILLINOIS
American Service in Training Co.
2301 South Montrose Avenue

ST. LOUIS, MISSOURI
General Aviation Company, Inc.
208 South Center Street
ST. LOUIS, MISSOURI
Yates Flying Service

GENERAL DISTRIBUTORS
CURTIS FLYING SERVICE, INC.
Who supply Command-Aires at their 14 Flying Fields
and at its operations with three-hundred thirty
SPRINGFIELD, MASS.
Stearns Flying Service Corp.
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NEW YORK CITY
Eastern Educational Corporation
Greater Building
BIRMINGHAM, ALA.
244 Jackson Avenue

LOS ANGELES, CALIFORNIA
Stearns Flying Service Corp.
2001 West Washington Boulevard

SEATTLE, WASH. (CITY)
McIntire Bros. Aviation, Inc.
3011 Duane Street

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At the Hub of the Highways of the Air



DIRECTLY between the principal airports of New Jersey and Long Island, General Motors Building towers, a giant sign post, pointing the way from Broadway, across Fifty-Seventh Street, to where the concrete ribbon of the Queensboro Bridge leads to the fields whence trans-Atlantic hops begin.

Located at the principal point of movement, with kinds air lack of industries concerned with every type of motor apparatus stretching away to

North and South, General Motors Building is an ideal market for those engaged in this most modern business of making the world air-minded.

Whether you sell tremendous hydroplanes or tiny spark plugs, there is a desirable location in this building just suited to your needs—and at a reasonable rental. In addition to its specific appeal to those in aviation, General Motors Building has these other advantages:

→ **ALL** transit lines stop here—the new Eighth Avenue subway has its entrance in the building—or you can easily walk from residential Manhattan.

REASONABLE rentals in suits of from \$50 to \$25,000 sq. ft.—lots of sunlight and air.

→ **THIS** location is an internationally known address.

THE vicinity includes such firms as General Motors Executive Offices, Chemical National Bank, Kelly Springfield Trust, some of the leading members of the New York Stock Exchange and other prominent business and professional concerns—representing a total expenditure of more than two billions of dollars.

→ **TRAINED** modern service—plenty of high speed elevators.

GENERAL MOTORS BUILDING

BROADWAY AT 57th STREET

HOFFMANN BUILDING, Inc., Owners

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Phone—CIRCLE 5506

AT THE ALL-AMERICAN AIRCRAFT SHOW — APRIL 6 — 14



THE SPARTANTM Challenger

Re-created and refined for the sake of beauty, utility and convenience, but retaining its supreme stability, the New Spartan C3—Challenger powered—comes to the Detroit show a distinct factor in the light commercial plane field.

Standard equipment includes: Streamlined Olex landing gear struts, 36x3 Bonvic wheels and external brakes, hooded magnets, compass, air speed and bank and turn indicators, Hamilton steel propeller and 19x3 indented tail wheel.

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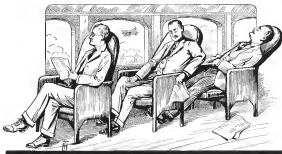


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We shall be very glad to estimate on your requirements.

Self adapting
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LAWRENCE D. BELL
President

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THE LEBLOND "90"

The seven-cylinder LeBlond, radial-type air-cooled, is the supreme "90" for the maker and user of two-place and three-place commercial planes. It occupies less space; offers a smooth, effortless stream of power; is easier to assemble and disassemble due to unit simplicity; costs less to operate; presents less head resistance; offers 90% interchangeability of parts with the LeBlond "60"... and is available at once.

For detailed information on request, Write now:
THE LEBLOND AIRCRAFT ENGINE CORP.,
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California Representatives: C. C. LeBlond Co.,
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**A SMOOTH EFFORTLESS
STREAM OF POWER**

U. S. Department of Commerce
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LEBLOND AIRCRAFT ENGINES

THANK YOU for the LeBlond AVIATION

Voltage Regulation

developed by

LEECE-NEVILLE

Applied to

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TYPE	VOLTS	AMPERES	R.P.M.
B-1	12	25	2000-3000
C-1	15	50	2000-3000
G-1	15	15	2250-4000
D-1	15	25	2250-4000
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On Display at

ALL AMERICAN AIRCRAFT SHOW

April 6-14th

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Savoia-Marchetti
world famous flying
boats and amphibians
to be manufactured
in America



MODEL S-55

AMERICAN Aeronautical Corporation will produce
time-tested Savoia-Marchetti seaplanes and amphibians
under the name of

AMERICAN SAVOIA-MARCHETTI

Two outstanding achievements of these planes are: Commander de Pinedo's sixty thousand mile flight around the world, crossing the Atlantic in both directions and touching six continents.

Commander Arturo Ferrarin's non-stop flight of 4417 miles from Rome to Brazil in July, 1928, in a Savoia-Marchetti S-64.

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That's the question

It should be firesafe but we don't want to make a big investment . . . we might move . . . we want something that can be enlarged if we need more space, etc., etc.

HERE'S THE ANSWER TO THESE QUESTIONS

Firesafe

**BLAW-KNOX
STEEL
HANGARS**

There's no longer doubt in your mind when you decide on a Blaw-Knox H.A.W.O.A.—You know you can enlarge it or move it to a new location—you know it will cost little to maintain because it is made of copper-bearing, aluminum steel and offers the utmost resistance to weather and corrosion. It solves all hangar problems of the present and anticipates the future. It is both permanent and portable and does not commit you to a vast investment which you may have to abandon without return. Ask our nearest district office for complete data.

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Blaw-Knox HANGAR erected for the National Airways Corporation at Jarama, D. C. Denver, also BLAW-KNOX, New York City.

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The Ideal Training Plane

Approved Type Certificate No. 105

The Swallow T-P—Approved Type Certificate No. 105—was first announced at the Chicago Show. Its reception by the trade since that time has been truly phenomenal. From the sales already made, it seems certain that more students will learn to fly in this plane than any other type, in 1929.

Swallow has built into the T-P all the well-known qualities for which the Pioneer Swallow has been so favorably known for many years.

Quick Take-Off—Slow Landing Speed—100% Visibility—remarkable ease of control in flight—Stability—and above all, a full measure of Swallow sturdiness and ruggedness in construction that means longer life—the ability to stand the hard knocks which students will give it—with Absolute Safety.

In addition to these other features, the T-P offers you other valuable features, including Students Rudder and Stick Release, crash pads, detachable motor mount (for any motor up to 110 H.P.)—all for \$1795 less motor and prop. at Wichita.

The Swallow T-P, with other Swallow models, will be on exhibition at the Detroit All-American Aircraft Show. See them there. Our representatives will be glad to give you any desired information.

THE SWALLOW AIRPLANE CO.
WICHITA, KANSAS

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Chicago
or
New York
it's
Always
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April 6, 1939

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AVIATION
April 6, 1939

Time has Written LAIRD'S best Testimonial



The first LAIRD biplane, 1918

FEW AIRPLANES can boast the ancestry of the LAIRD-WHIRLWIND. As long ago as 1912, the first LAIRD biplane was created. It is a far cry from this pioneer of the air-lanes to the modern LAIRD-WHIRLWIND.

LAIRD Airplanes have been in commercial service long enough to be time-tested and proved. One LAIRD-WHIRLWIND on the Chicago-Minneapolis mail route covered upwards of 70,000 miles and was never off the run for repairs of any kind. Other privately owned LAIRD-WHIRLWINDS have been in continuous service, one with a total in excess of 300,000 miles to its credit without major repairs.

Recently Chas. ("Speed") Holman of Northwest Airways piloted his LAIRD LC-8 from Minneapolis to Chicago, covering the 350 miles in 1 hour and 58 minutes.

The history of LAIRD-WHIRLWIND includes:
The record non-stop flight between Chicago and New York.

A down-and-up flight between Miami, Fla. and Chicago.

1st and 2nd place in the Class "B" 1917 National Air Derby, Chicago to Spokane.

2nd place in Class "B" 1928 National Air Derby, Chicago to Los Angeles.

1st and 2nd place in Los Angeles-Cincinnati Air Derby, September, 1934.

These are high-lights. By consistent performance in government, commercial and private use, the LAIRD-WHIRLWIND has justified a reputation for speed and dependability. LAIRD superior design and LAIRD superior workmanship plus Whirlwind power result in the perfected flying unit.

See the
LAIRD
Exhibit at the
Detroit Show
April 6-12

LAIRD airplanes are built for the commercial buyer whose chief interest is high efficiency and dependability rather than price. We invite such buyers to write for our free booklet and the name of nearest distributor who can arrange a demonstration.



The Newest LAIRD—Whirlwind LC-8, 1939

E. M. LAIRD AIRPLANE COMPANY

Asbarn Field—4500 W. 83rd St., Chicago

Laird airplanes are manufactured only by the E. M. Laird Airplane Co., Chicago, Ill.



Distributors: Exclusive territories available for established firms with funds and suitable demonstration facilities to handle LAIRD sales. Factory space and personnel production facilities longer present delivery.

LAIRD AIRPLANES LEAD THE FIELD

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\$25



New
BLACK & DECKER
Quarter-Inch
Light Duty Electric Drill

An unprecedented price for an electric
drill of Black & Decker quality

A strong,
serviceable,
general purpose tool

The Black & Decker Mfg. Co.
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"With the Pistol Grip and Trigger Switch"



PLANE PERFECTION!

Unparalleled performance by the "Bird" of them all—Just visualize gracefully taking off within one hundred feet with capacity load! Sail through the air at one hundred and twenty miles an hour . . . then an assured leisurely landing as slowly as thirty-five miles an hour. That is the ease with which you can fly this Superior OX5 model. Full details in the "Bird" pictorial booklet—A brochure that takes you through the "Bird" factory with a minute story of the construction of this remarkable plane.

"SAFETY AND PERFORMANCE"

"A few valuable dealer franchises available."

BRUNNER-WINKLE AIRCRAFT CORPORATION
1-17 HAVERKAMP STREET, BROOKLYN, NEW YORK

The D. H. Gipsy **MOTH**

offers a valuable
FRANCHISE
to
Qualified Dealers



THE Gipsy Moth is already a world-wide success! Its performance, reliability, safety and economy have been proved during the past four years by over 5,000,000 miles of flying. Uses famous 100 horse-power D. H. Gipsy Engine, designed and built by de Havilland, in England, and entering American production by the Wright Aeronautical Corporation in April.

Moth Economy Makes Big Profits for Users

The Moth can be operated for less than \$5.50 an hour, including all charges but depreciation and pilot's time. Folding wings permit storing three Moths in space occupied by single ordinary plane. This unusual economy makes the Moth exceptionally profitable for flying schools, private instructors, taxi service and other commercial work.

For Training: The Moth is the finest dual instruction plane yet produced. Used in military and civilian flying schools all over the world. Exceptional safety through use of famous slatted wings; unusual visibility; flies equally well from either cockpit; extra sturdy landing gear. Students can pass from Moth direct to practically any other plane without use of intermediate types.

For Taxi Service: The Moth carries one passenger with pilot

and 200 pounds of baggage at cruising speed of 45-50 miles per hour. Moth economy assures a profit on rates 50% lower than usual.

For Personal Use: The Moth is the ideal plane for the private owner. It is a most comfortable place to fly. Off the ground in 30 yards; lands and stops in 150. Can be stored in a single-car heated garage. Uses any gasoline. Equally good for short hops and long cross-country flights.

A Tremendous Market Is Waiting

A Moth sales franchise will be immediately profitable and will constantly increase in value. Territories are rapidly being closed, but many opportunities still exist for qualified Distributors and Dealers. Write now for details—over 50% of 1939 Moth production is already sold! Or see our representative at Detroit Show who will demonstrate the Moth and explain the Moth franchise.

Moth Distributors

Metropolitan New York and Northern New Jersey
Earl L. House, Graybar Building, New York

Northeastern New York; Albany Air Service, P.O. Box 1145, Albany, New York, and Albany Airport

New England: Skyways, Inc., Copley Plaza Hotel, Boston, Mass.

Ohio and Michigan: Thompson Aeronautical Corporation, 2706 Clarkwood Road, Cleveland, Ohio



REGISTERED TRADE MARK OF
HAWKLAND AIRCRAFT CO., LTD.

MOTH AIRCRAFT CORPORATION, Lowell, Mass.

MOTH Distributors

The following Distributors are qualified to appoint local Dealers in their territories. They will demonstrate the D. H. Gipsy Moth to prospective Owners and Dealers

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EARL L. HOUSE

Graybar Building, New York

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ALBANY AIR SERVICE

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New England

SKYWAYS, Inc.

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2196 Clarkwood Road, Cleveland, Ohio

PIONEERS TOGETHER
GLIDDAIR

INTO the new and intensely fascinating field of air transportation, The Glidden Company has pioneered from the start with a complete line of finishes, the Gliddair brand.

Each and every one of these products bears the stamp of approval of The Glidden Company. Each one has been carefully tested and proved by experts for the work it is to do.

Color, protective coatings, primers, varnishes, dope, lacquers—all can be secured in Gliddair finishes.

A flash of sun on wing—motor port—wing of hand—then a fading into the distant horizon

GLIDDAIR FINISHES are:

Gliddair Clear Nitrate Dope	Gliddair Spar Varnish	Gliddair Wood and Metal Preserving Oil
Gliddair Clear Acetate Dope	Gliddair Alkylamine Mixing Varnish	Gliddair Metal Primers
Gliddair Pigmented Dope	Gliddair Dope Proof White	Gliddair Enamels for Wood and Metal
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THE GLIDDEN COMPANY
NATIONAL HEADQUARTERS, CLEVELAND, OHIO

GLIDDEN
EVERYWHERE on EVERYTHING

27 YEARS THE LEADING BRAND IN THE FIELD



See the FOKKER exhibit at the Detroit All-American Aircraft Show

Experience and reputation are the inherent Fokker qualities that safeguard your investment in Fokker aircraft.

Already more than 14,000,000 miles of safe travel have been flown in Fokkers . . . more than 10,000 Fokker aircraft have rendered satisfactory service over a network of air routes that cover the world.

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tenance pioneered by Anthony H. G. Fokker and increasingly perfected for 19 years.

Passengers have confidence—pilot's feel security—in the stamina, dependability and safety of Fokker aircraft. Many huge corporations realize the utility and economy of adopting Fokkers for executive transportation.

During the All-American Aircraft Show in Detroit this week, we cordially invite you to visit the Fokker display and learn the many advantages of Fokker ownership.

Fokker Aircraft Corporation of America

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A SENSATIONAL story of Silvertown tire value is today being disseminated before a Nation of eager motorists.

The Silver Fleet of 14 shining new cars and one new truck speeds its way across the country, deliberately seeking out the worst roads and the bumpiest going, to demonstrate, as your agent, to those drivers who have yet to ride on Goodrich Silvertown, the lasting qualities of a superior tire.

As impressive, as dramatic as this tire demonstration may be to the watching public, there is not a licensed pilot flying today but who at one time or another has

shared his lucky stars that his airplane tires, too, would withstand more punishment than they will ever be called upon to withstand.

Goodrich Silvertown Airplane tires are designed with a view of lightness, with rigid adherence to a long-established Goodrich principle that Silvertown Airplane tires must resist excessive strain.

They are demonstrating their superiority on the flying fields at the Nation just as definitely as the tires on the cars of the Goodrich Silver Fleet are demonstrating their superiority over other makes out on the byways of America.



Both Goodrich Silvertown airplane tires and Goodrich Silvertown auto tires for automobiles will withstand greater punishment than is ever required of them.

GOODRICH has staked out its field in aviation. The realm of heavier-than-aircraft is its zone of endeavor. There Goodrich has pioneered . . . there Goodrich has won airplane honors. And there Goodrich still flies with the leaders, with its products as far advanced over others as the modern airplane is advanced over the biplane of two decades ago.

THE E. F. GOODRICH RUBBER COMPANY, Akron, Ohio, has New Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Co., Montreal, Que.



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Rubber for Airplanes

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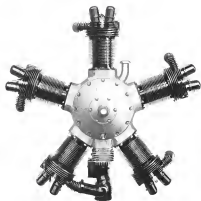
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**5 CYLINDER
100 HORSEPOWER**

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AIRPLANE AND MOTOR CORP.



The Improved KINNER

The Improved Kinner 5 cylinder radial engine brings to the 100 horsepower field standards of production, material and performance comparable in every detail with military power plant requirements.

Catalog on request

Kinner Airplane & Motor Corporation
GLENDALE • CALIFORNIA

Safer and Better Performing Airplanes



*Front View of Aristocrat Cabin Monoplane
Illustrating the Twin Basic Design of All GAC Airplanes*

A YEAR ago when the personnel of the General Airplanes Corporation was sustained aeronautical circles began to look forward to better airplanes, because the engineers and manufacturing executives of this organization, with an average experience of more than twelve years in America and Europe, were recognized as leaders of advanced design.

Today GAC airplanes, after months of hard usage, have fully justified this expectation.

The Aristocrat Three-Place Cabin Monoplane is recognized in the industry as having established new high standards of safety and performance.

World-famous pilots are enthusiastic in their praise. They talk about its ease of handling, quick take-off and easy landing.

It is as comfortable for winter flying as a cloud automobile.

Cost of operation and maintenance are surprisingly low.



Aristocrat now being used by Commander Richard E. Byrd in his Antarctic Expedition.

also enables aircraft operators to furnish safe, comfortable, low-cost air transportation.

Strictly a quality product, the Aristocrat is the ideal airplane for the business executive, the well-to-do young man and others who demand the best. It

A Complete Line

General Airplanes Corporation manufactures a complete line of commercial airplanes of advanced design, all conforming to the specifications of the U. S. Army, Navy and Department of Commerce, as well as the I. C. A. N.



Dealers: Perhaps your territory is still open.
Write or Write for our District Office.

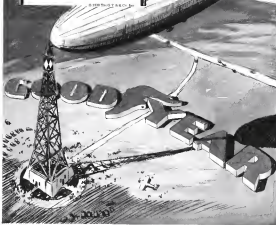


GENERAL AIRPLANES CORPORATION, 552 Abbott Road, Buffalo, N. Y.

Look to Goodyear

Any idea, any question that you bring to Goodyear gets prompt attention and understanding. For here is a large department that has just one duty—to do everything within power of The World's Greatest Rubber Company to assist the progress of aviation. If you design aircraft, or build them, if you operate planes, or air transport lines, look to Goodyear for any data, or advice, or equipment that is concerned with rubber. Write, wire, please, or come personally.

Aerospace Department
GOODYEAR, Akron 16, OHIO
You are cordially invited to visit the Goodyear display table Device through Show



THANK YOU for watching AVIATION

GATES AIRCRAFT CORPORATION Brings to America—

The Famous

Best



Gates R. S. V. 15-100

Because of its unexcelled safety features the Gates R. S. V. airplane fills the personnel in America for a light, safe, sound, outboard, economical plane that will be in the hands of the average person of little flying experience. Its portability, achieved in the Gates R. S. V., . . . so simple the operation of its controls . . . that landings and take-offs are accomplished with almost ease and security. For the past four years in the exclusive training plane of the Belgian Army, it has established an unapproachable record of more than 200 officers trained without a single accident.

One of the outstanding features of the Gates R. S. V. is its changeable wings permitting quickly and with ease the transformation of the plane from slow airplane to fast monoplane. As a light plane, landing speed may be safely decreased to 20 miles per hour. As a monoplane, a high speed of 115 miles per hour may be attained. There is no failure of the Gates R. S. V. that has not withstood the most test of many hours operation under most trying conditions. Complete information and detailed specifications will be sent to interested persons on request.

GATES AIRCRAFT CORP.

1440 B'way



New York City



Gates R. S. V. 15-100

Transformation from monoplane to biplane or the reverse is easily accomplished in less than two hours.

THANK YOU for watching AVIATION

AIRPORTS

of All-Weather Permanency

—built by LEONARD MACOMBER, Inc.

AIR minded cities must build for the century, not for the moment. The airport that swings the nation's air traffic to your community will be more than a landing field—it must be built by experts who anticipate tomorrow's demands.

Leonard Macomber, Inc., one of America's leading public park and golf course architects and constructors, with a background of 18 years' experience, has established a complete airport development service, composed of men who are veterans in things aeronautical. Leonard Macomber, Inc., is a highly specialized organization of men who have recognized today what the world of aviation will demand tomorrow.

This organization is equipped to give comprehensive airport

service, including: preliminary flight and topographical survey; selection of site; plans and specifications for field layout, marking, desiring, grading, leveling, surfacing, runways, lighting, mooring masts, buildings and hangars; complete engineering, architecture, construction and consultation. This organization will furnish skilled supervision and will contract for all or any part of your airport needs.

The complete "one-profit" contracting service offered by this concern assures economical outlay and expenditure and results in a completed airport of minimum maintenance cost.

City officials, Association of Commerce and owners of private property who wish to develop airports are urged to communicate with us immediately.

Design and construction by Leonard Macomber, Inc., is the best assurance that the completed airport will receive the highest possible government rating.

LEONARD MACOMBER, INC.

Airport Engineers and Builders

664 North Michigan Ave., Chicago, Illinois



Far into the Arctic the Hamilton Metalplane spreads its fame—

"Flight From Nome Finished In Bush" . . . "Ned Wien Will Make Trip To Siberian Coast" . . . In this summer the Daily News-Miner of Fairbanks, Alaska, chronicled these noteworthy Hamilton achievements. It seems that no corner of the earth is so obscure that it is beyond the reach of Hamilton fame . . .

From Alaska to the Tropics the Hamilton Metalplane is serving faithfully in the cases of commercial flying. It has brought new speed . . . new comfort . . . new comfort into the field of air travel. It has strengthened men's faith in flying by establishing a new standard of safety.

The Hamilton Metalplane is built entirely of metal non-corrosive duralumin. It embodies all features of good airplane value. It is a fire-resistant . . . weather-proof and rust-proof. It has tremendous power in reserve. It has a known margin of safety. It is economical and air worthy.

Write for full details of this remarkable transport of the air . . . or if you can, see it at the Detroit Show. Hamilton Metalplanes are furnished with either Pratt & Whitney "Wasp" or "Hornet," depending upon individual requirements. They may be fitted for either land or sea travel . . . and are quickly convertible for either type of service.

At Detroit—

Principals of this company will be at the Book-Cadillac Hotel during the Detroit Aircraft Show.



BOJING AIRPLANE CO.
HAMILTON METALPLANE DIVISION, MILWAUKEE, WIS.

Approved typed
Certificate
No. 25

Hamilton

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No. 94

Specialization Concentration

COME to Cable Headquarters with your electric wiring problems. Our Aviation Department will gladly give you specialized engineering service based on more than a quarter century of automotive cable manufacturing experience.

Ignition Cable—Lighting Cable
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or plain braided.

Made up in Harness
or furnished in bulk.

THE NEW STANDARD IS THE TRUE STANDARD



20
years of experience created
the **NEW Standard!**

THERE is no substitute for experience. Twenty years ago Charles Healy Day was building good airplanes. The New Standard represents the knowledge gained in those two decades. The New Standard is new in design and construction and it sets new marks of strength, safety, efficiency and performance. Prices range from \$6,000 to \$9,000 with choice of Wright Whorlwind, or Hispano Model "E" engines. Models include 5 place, all metal, or combination 3 place and metal. All models approved by U. S. Dept. of Commerce. Catalog on request.

Can you qualify as a dealer or distributor? Your territory may be open.

SPECIFICATIONS

Wing area, including elevator	224 sq. ft.
Incubator and Elevator	50 sq. ft.
Fin and Rudder	112 sq. ft.
Length over all	30 1/2 ft.
Span of Upper Wing	41 ft.
Span of Lower Wing	31 ft. 6"

PERFORMANCE

High Speed—(Full load)	225 m.p.h.
Cruising Speed—(Half load)	90 m.p.h.
Landing Speed—(Full load)	40 m.p.h.
Disposable Load	1,200 pounds
Pay Load—4 passengers	600 pounds

Watch for the New Standard training plane—a sturdy little two-place biplane, powered with American Cirrus engine and low in price. Write for details.

DISTRIBUTORS:

L. & D. Aircraft Corp., Bedford, Conn.
Clifford Bell, Inc., Pittsburgh, Pa., and
Cleveland, Ohio
Kaplan Air Transport, Inc., Montreal
Airport, Montreal, N. Y.

New Standard Flying Service, Torrington
Airport, Waterbury, Conn., N. J.
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hill, Washington, D. C.
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—and the STANDARD STEEL PROPELLER used on the Lockheed "Air Express" can be inspected at the Exposition

At the Second Annual All-American Aircraft Show at Detroit will also be displayed a three-bladed propeller suitable for use on Pratt & Whitney "Wasp" Engine, several Standard propellers for Wright "Whirlwind" Engines, Curtis OX-5 and for other lower powered engines.

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Standard Steel All Metal Propellers—first developed in 1919—may be obtained for engines rated at ninety to six hundred horsepower.

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Successful transport service

Assumes the selection of a route and terminals capable of providing enough business to make the work profitable, three things are essential to successful air transport service. These are safety, regularity and comfort.

The choice of places to fly the route, therefore, boils down to determining which are most certain to provide these essentials. And no better any comprehensive study of the field must include the Ford tri-motored all-metal transport monoplane, which was one to lighten passengers and has a cruising radius of five hundred miles.

Safety, demands reliability of power plant—and that's why the Ford plane's power is divided into three units, any two of which will keep it going. Three engines for safety. Three engines too, for regularity. A checked fan, a duty distributor, a fan, fitted spark-plugs can't force the Ford plane down short of its terminal.

Safety likewise demands complete ground control of the plane, especially for short fields. To provide it, the Ford plane has independently operated landing wheels give reasonable control of the plane on the ground even when taxiing across stiff wheels.

Regularity demands a plane that is on the job, day after day, in perfect condition for work. That's why the Ford plane is built entirely of metal—not a rack of wood or a square inch of fabric in its structure. Nothing to warp out of alignment, nothing to split or tear or patch. A peculiar thing about durability is this: The longer the plane is in service the easier it looks—constant working and rubbing down give it a high polish. It is a masterpiece of ease.

Perhaps the best evidence of the Ford plane's regularity is its record. Over a period of more than three years in daily operation on the Ford air routes, the schedules have been maintained at an efficiency of more than ninety-six per cent!

Comfort? Mental comfort is three engines, in the familiar dependability of metal, in the plane's ease and stability. Physical comfort in its reduced cabin with plate glass windows which can be opened for ventilation or in the efficient heating system which provides comfort in winter. Comfortable seats. Mail—fast engine noise. The convenience of a lavatory!

Consider the Ford plane carefully for your transport service. Write us for any information about it you may desire.

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